JR
3-12-86
H 19
e-85 0 15-2

PENNSYLVANIA PUBLIC UTILITY COMMISSION

vs.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

ADDITIONAL REBUTTAL TESTIMONY OF THOMAS P. HILL, JR.

Re: 80%/20% ENERGY COST RATE MECHANISM

MARCH 1986

ADDITIONAL REBUTTAL TESTIMONY OF THOMAS P. HILL, JR.

1 Q. Are you the same Mr. Hill who has previously filed direct

2 and rebuttal testimony in this proceeding?

3 A. Yes. I have previously submitted direct testimony

4 identified as PECo Statements No. 18, 18A and 18B and I

5 have submitted rebuttal testimony identified as PECo

6 Statements No. 18C, 18D and 18E.

7 Q. What is the purpose of this rebuttal testimony?

8 A. This rebuttal testimony addresses portions of testimony

9 filed by Commission Trial Staff Witnesses Rosenthal and

10 Hosler and Governor's Energy Council Witness Wilson both of

11 which seek to modify the Company's proposed ECRF Tariff

12 provision for implementation of an 80%/20% ECR mechanism.

13 Portions of these testimonies not addressed by me will be

14 discussed by Mr. Carroll in his additional rebuttal

15 Statement 22D.

16 Q. What comments do you have concerning Staff Statement ECR-1

17 submitted by Mr. Rosenthal and Mr. Hosler?

18 A. I believe that these Staff Witnesses have misinterpreted

19 the Commission's Order at Docket M-840375 and in doing so

20 have incorrectly restructured the Company's proposed ECRF

21 Tariff provision. Principally, it is the opinion of these

22 witnesses that the portion of the Company's fuel and

23 interchange expenses not subject to reconciliation (i.e.

24 20% of total energy expenses) should be recovered in base

25 rates based upon a normalized level of energy costs for a

26 three-year period, and that this established level should

27 remain in effect until revised by the Commission in a

1   future base rate proceeding.

2   To begin, there is absolutely no mention in the

3   Commission's Order at Docket No. M-840375 of establishing a

4   normalized level of energy expense for either the portion

5   subject to reconciliation or the portion not subject to

6   reconciliation. In fact, the word "normalization" does not

7   even appear in the Commission's discussion or Ordering

8   paragraphs on this issue. Further, there is no mention by

9   the Commission in its Order mandating or even suggesting

10 the use of a three-year period to determine the projected

11 level of energy expense subject to reconciliation or not

12 subject to reconciliation. The only mention of three-year

13 data in the Commission's Order is that reference cited by

14 these witnesses which requires that Company to file

15 historical and prospective data on individual energy

16 sources or components comprising our energy supply mix.

17 There is absolutely no mention in the Commission's Order

18 that three years of prospective data shall be employed in

19 the determination of proper level of energy cost recovery.

20 Contrary to the Staff's conclusion that there is "no

21 clear expression", I believe the Commission's Order is

22 quite explicit when it states:

23   "Upon investigation of the ECR filing and

24   accompanying data by the Commission, and after

25   hearings thereon and approval by the Commission of

26   the ECR, the Company will commence recovery of the

27   energy costs included in said approved ECR on the

1 levelized monthly basis, beginning with the

2 calendar month following issuance of a final Order

3 of the Commission in the Company's current rate

4 filing and any subsequent general rate filing. (19)

5 (19) The projected energy costs levels will remain in

6 effect until revised levels are determined _in_

7 _subsequent Commission proceedings._" (emphasis

8 added)

9 It is quite clear, in my opinion, from the Commission's

10 Order, that the Company's estimates for fuel and

11 interchange expenses submitted in this proceeding, will

12 _upon investigation,_ be utilized to develop an Energy Cost

13 Rate Factor for perspective application to customers

14 bills. It is also clear that the _single_ estimate so

15 determined shall form the basis of both the energy costs

16 subject to reconciliation (i.e. 80%) and energy costs not

17 subject to reconciliation (i.e. 20%).

18 The Staff has recognized that the portion of energy

19 costs subject to reconciliation _is subject to modification_

20 and, therefore, on the same basis, the 20% element not

21 subject to reconciliation should be subject to similar

22 modification.

23 Further, as the Order states, these energy cost levels

24 will remain in effect until revised levels are determined

25 in _subsequent Commission proceedings._

26 While I agree with Staff that current ECR procedures do

27 not usually include hearings on prospective year estimates,

1 it is my understanding that the Commission does routinely

2 review a Company's Energy Cost Rate procedures and

3 estimates under the provisions of Section 1307(e) of the

4 Pennsylvania Public Utility Code. Each Energy Cost Rate

5 estimate submitted for approval by the Commission is

6 subject to the review of the Commission Staff and if such

7 estimates are found acceptable, the Commission acts to

8 allow these revisions to go into effect. If there is a

9 determination by the Commission that hearings are necessary

10 in order to substantiate the Company's estimate, the ECR as

11 filed may be implemented or adjusted by the Commission

12 subject to further investigation. Therefore, the term

13 "proceedings" could very well apply to the current

14 methodology utilized to approve an Energy Cost Rate filing.

15 For the reasons I have stated, I believe the Company has

16 correctly interpreted the words and concepts expressed by

17 this Commission in its Order.

18 Q. What would be the consequences of adopting Trial Staff's

19 proposal?

20 A. In my view, adoption of Trial Staff's proposal would

21 produce several adverse consequences. First, under Trial

22 Staff's proposal, the 20% of energy costs in base rates

23 could only be changed in a base rate proceeding, which

24 substantially increases the risk and extent of under and

25 over collection. Utilizing an estimate of three years'

26 worth of projected energy cost data to develop a normalized

27 energy cost level, as the Staff proposes, is difficult to

1 predict with great accuracy. Therefore, energy cost

2 variations are bound to occur, with the adverse impact

3 borne by ratepayers or shareholders. Even when a base rate

4 proceeding is filed, there will be substantial lag, (i.e.

5 up to nine months) before the 20% component of energy costs

6 could be changed. In circumstances of a rapid increase or

7 decrease in oil prices, sales, or expected outages, there

8 could be a substantial variation in energy costs and a

9 substantial lag in reflecting that variation. By contrast,

10 under the Company's proposal, the 20% of energy costs not

11 subject to reconciliation would be reforecasted annually

12 with far less lag in implementation, to the benefit of both

13 ratepayers and shareholders.

14 Second, under Trial Staff's proposal, the Company would

15 have to prepare and the Commission would have to review,

16 two separate forecasts of its energy costs--one to

17 establish the 80% ECR and one to establish the 20% of

18 energy costs in base rates. In my view, this is a needless

19 and unnecessary duplication of effort by the Company and

20 the Commission. By contrast, under the Company's proposal,

21 the Company would present one annual energy cost projection

22 which would be used consistently to establish both the 80%

23 and 20% components of an 80%/20% ECR.

24 Third, as I have discussed in other testimony, an

25 adjustment to the base cost of fuel at this late stage in

26 the proceedings, would certainly be counterproductive in

27 light of the fact that the Company's cost allocation

1   and rate structure proposals have been based upon a base

2   cost of energy equal to 20.823 mills per kilowatthour. Not

3   only has the Company employed this base cost for cost

4   allocation and rate structure purposes but also, all other

5   parties to this proceeding have prepared their testimony

6   and have been cross-examined on the basis of the Company's

7   proposed base cost. To my knowledge, no other intervenor

8   has based their rate structure proposals on any other base

9   cost. An adjustment at this time would require substantial

10   re-work on behalf of all parties to the case.

11   Finally, I disagree with Staff's conclusion that their

12   proposed modification to the ECRF will facilitate its

13   administration. The Company's proposal of the 80%/20%

14   mechanism implements no change to existing procedures of

15   the ECR. Procedures already in place for review and audit

16   would perform in exactly the same manner as they perform

17   today under existing ECR provisions. Staff's conclusion

18   that the Company's filing may entail hearings which would

19   place an additional burden on the Commission and the

20   Company is in error. Even under existing ECR procedures

21   and the existing ECR clause, the Commission may suspend for

22   investigation any portion of the Company's proposed ECR

23   filings. Establishing a normalized level of energy expense

24   for that portion of energy costs which are not reconciled,

25   may in itself require annual base rate filings by the

26   Company in order to re-establish energy costs at current

27   and appropriate levels. This most certainly would be an

1   additional burden on the Commission and the Company.

2   For these reasons, I believe Staff's proposal to modify

3   the base cost of energy as defined by the ECRF should be

4   rejected.

5 Q. Please continue with your discussion of the Staff's

6   proposed modifications.

7 A. Staff witnesses have also proposed to remove the cap

8   provision which I discuss on pages 16 through 19 of my

9   Statement 18B. I agree quite strongly with the Staff that

10   the Commission's Order at Docket M-840375 "at no point,

11   discusses a cap." Likewise, at no point in the

12   Commission's Order does it preclude such a provision.

13   Since the Commission has indicated that no ECR revision

14   will be implemented until there has been an investigation

15   and hearings on the Company's filing, I fail to understand

16   why the Company is precluded from presenting what we

17   believe to be a reasonable and integral part of the energy

18   cost recovery system.

19   Staff's conclusion that the cap, as proposed, would act

20   only to modify the 80%/20% split fails to recognize the

21   intended purpose of the mechanism. The cap is a "safety

22   valve" to protect both the customers and the Company from

23   an experimental program by placing an upper and lower limit

24   on the maximum gains or losses which would occur due to a

25   major variance in energy costs. Utilizing Staff's own

26   numbers contained in Schedule 8, page 1 of 4, which will be

27   discussed by Mr. Carroll, concludes that energy

1   costs for Philadelphia Electric Company will average

2   approximately $480 million over the next three years.

3   Under these circumstances, energy costs would have to

4   increase or decrease by <u>36% before the cap would apply</u>.

5   While this is not an improbable occurrence, it is certainly

6   one of significance that should be recognized and provided

7   for.

8   Staff also asserts that a cap could not be implemented

9   if their proposal is adopted because the 20% of costs would

10   be recovered in base rates and therefore, cannot be

11   reconciled under Section 1308. I disagree. Under Staff's

12   interpretation, a fixed mill per kilowatthour rate would be

13   included in base rates established in base rates pursuant

14   to Section 1308, and that amount would not change.

15   Reconciliation of the 80% as well as application of the cap

16   would take place under Section 1307 of the Public Utility

17   Code, without a base rate adjustment.

18   Staff's only other concern on the proposed cap, is that

19   a cap is inappropriate because of the variation in fuel

20   costs year to year. I agree that this variation can occur

21   and that this is a primary reason for establishing a cap.

22   Moreover, this concern highlights one of the major problems

23   in utilizing staff's proposed normalized level of energy

24   expenses to determine the 20% of energy costs not subject

25   to reconciliation. Use of normalized energy expenses <u>will</u>

26   <u>result in inappropriate gains or losses</u> due to the

27   refueling cycles on nuclear units. Staff's concern for

1   inappropriate gains and losses through the application of

2   the cap is eliminated if the Commission adopts the

3   Company's proposed ECRF Tariff which adjusts all energy

4   costs on an annual basis.

5 Q. Are there other concerns with regard to the Staff's

6   proposed revisions?

7 A. Yes. Staff witnesses have recommended that we include a

8   provision for interim rate changes in the tariff language.

9   While the Company does not oppose such a provision in

10   concept, the proposed wording recommended by staff is

11   somewhat confusing. Staff's recommended tariff language is

12   as follows:

13   "However, if such rate will result in substantial

14   over or under collection during the remainder of the

15   ECRF computation year the "F" factor of the rate may

16   be revised on a perspective twelve-month basis."

17   First, this language, as written, does not define

18   substantial in terms of an absolute dollar amount or

19   appropriate percentage variation which subjects this

20   Commission to various interpretations. Second, the Staff's

21   proposal recommends that such revisions be based upon "the

22   remainder of the ECRF computation year" which is in my

23   opinion in conflict with the current position of the Bureau

24   of Audits who recommends that prospective changes be based

25   upon review of the remaining months in the 1307(e) year,

26   which ends two months prior to the computation year.

27   Third, this language suggests that revisions be made on a

1   prospective 12-month basis which is also in conflict with

2   what I believe to be the position of the Bureau of Audits

3   who recommends that interim adjustments to the ECR should

4   be calculated on the basis of the remaining months for the

5   computation year.

6   In light of these concerns, I would suggest that Staff

7   language be replaced with the phrase:

8   However, if such rate will result in an over or

9   under collection of 10% of total estimated energy

10   expenses for the computation year during the

11   remainder of the 1307(e) reconciliation year, the

12   "F" factor of the rate may be revised on a

13   prospective basis for the remaining months of the

14   computation year."

15 Q. Would you please discuss Staff's proposed transition from

16   the existing ECR to the existing ECRF clause?

17 A. Yes. Staff witnesses have generally proposed the same

18   format for transition between clauses as I have outlined in

19   my Statement 18B, with some minor exceptions. On Schedule

20   2, page 2 of 3 of Staff Statement ECR No. 1, concerning the

21   definition of the "E" factor, Staff indicates that the

22   first "E" factor time period will be for the 15 months

23   ending with the April 1986 billing period which is in

24   conflict with the statements made on pages 16 and 17 of

25   their testimony where they indicate that the first 1307(e)

26   will be for the 15-month period ended April 30, 1987. The

27   tariff language in their exhibit (i.e. April 1986) conforms

1   with the Company's proposal which I believe to be the

2   proper conclusion.

3   In order to implement the new ECRF, it is important to

4   recognize the latest available data for over or under

5   collections in computing the first ECRF factor, which would

6   include all data on over/under collections for the period

7   ending two months prior to the proposed rate change. In

8   order to employ this data, the Company must submit our

9   1307(e) reconciliation for the 15-month period ended April

10   30, 1986 after the close of this record but before the

11   Commission issues its final Opinion and Order in this

12   proceeding. I therefore recommend that the Administrative

13   Law Judge recognize that this information is critical to

14   the determination of the proper ECRF factor and as such the

15   Commission should take notice by this information in its

16   final determination, even though the record has been

17   closed. I would propose to submit this reconciliation

18   within 30 days after the conclusion of the reconciliation

19   period.

20   Staff further recommends that the Company submit final

21   energy cost projections by March 3, 1986 in order to

22   calculate the first ECRF factor. Because of the limited

23   amount of time available before the close of the record, it

24   is the Company's position that the energy cost projections

25   calculated by Mr. Carroll in his additional rebuttal

26   testimony submitted concurrently with this statement be

27   utilized as the basis of the first ECRF. Mr. Carroll has

1   modified the data that he submitted in late December 1985

2   to accept or modify certain of the adjustments proposed by

3   Staff Witnesses in Statement ECR No. 1. I have provided a

4   recalculation of ECRF Statement No. 1 on the basis of these

5   modifications with a re-estimate of the "E factor" based

6   upon the latest available data. This recalculation is

7   attached as Appendix A to this testimony. As I have

8   previously stated, this "E factor" must be updated for

9   actual data through April 30, 1986.

10 Q. Would you please discuss Staff's comments concerning the

11   guarantees of fuel savings for Limerick Unit No. 1?

12 A. I generally concur with many of the statements made by

13   staff witnesses which oppose the incorporation of such a

14   guarantee. Staff indicates that the 80%/20% mechanism

15   already reflects a form of guarantee for performance of all

16   Philadelphia Electric Company generating units. In

17   addition, the Staff notes that the $207 million average

18   two-year savings estimate, which was filed with our initial

19   submittal to the Commission in September, is no longer an

20   appropriate representation of estimated fuel savings, and

21   would therefore be inappropriate to utilize as the basis of

22   a specific guarantee. Likewise, Staff has noted that the

23   use of an average savings over any period of years is

24   inappropriate under the provisions of the ECRF since annual

25   savings vary substantially from year to year in recognition

26   of nuclear refueling outages.

27   I do not agree with Staff's specific recommendations to

1   modify the ECRF if the Commission were to order a specific

2   Limerick savings guarantee. To begin, under such a

3   guarantee, coupled with the 80%/20% mechanism, the Company

4   would be penalized twice; first, under the specific

5   guarantee and second, an additional 20% penalty under the

6   provisions of the 80%/20% mechanism. In addition, the

7   Staff's proposal utilizes estimated energy savings rather

8   than capacity factor. The total dollar level of energy

9   savings is based upon many elements of cost which are

10   beyond the control of the Company and which make a specific

11   dollar guarantee inappropriate as explained in my Statement

12   18B. Finally, Staff's proposal is inequitable since the

13   proposal as outlined would only provide for a penalty if

14   the unit failed to meet the expected level of generation

15   but does not provide for a benefit to the Company if the

16   unit exceeds an expected level of generation.

17 Q. What comments do you have concerning the direct testimony

18   of GEC Witness Wilson as presented in GEC Statement No. 1C?

19 A. Dr. Wilson's statement can be divided into two distinct

20   areas. First, in the first 36 pages of his testimony, Dr.

21   Wilson discusses his theory of fuel adjustment clauses and

22   in the last nine pages he makes a specific recommendation

23   for modification to the Company's existing ECR. My

24   response to Dr. Wilson will follow this same format.

25 Q. Please discuss Dr. Wilson's theories on energy cost

26   recovery.

27 A. I generally agree with Dr. Wilson's basic description of

1   the history of fuel adjustment clauses, however, I must

2   strongly disagree with many of the conclusions that he

3   draws in his discussion. For instance, Dr. Wilson

4   indicates that "from a cost recovery point of view, the

5   need for ECR or FAC procedures have diminished." To the

6   contrary, the necessity of a fuel adjustment clause is as

7   essential today as it was in the early 1970s. The

8   volatility of fuel prices, particularly oil prices, coupled

9   with the high proportion of fuel costs to total operating

10   expenses for a utility makes an energy adjustment clause a

11   necessary regulatory tool. Dramatic increases as well as

12   decreases in the absolute cost of fuel are certainly as

13   likely today as they were throughout the 1970s, as

14   explained in my Statement No. 18B and Mr. Carroll's

15   Statement No. 22A.

16   Dr. Wilson discusses at great length what he perceives

17   to be significant disadvantages of an ECR (pages 10 to 13

18   of Statement GEC No. 1C). While I cannot disagree in

19   theory with many of these conclusions, these "disadvantages"

20   have not materialized in the real world. While it is true

21   that a utility is made whole on one portion of its cost of

22   service if it is allowed to reconcile fuel costs, there is

23   no practical support for his conclusion that other costs of

24   service may be going down thereby creating offsets or

25   reductions to the other elements of cost of service.

26   Dr. Wilson's conclusions that interim adjustments by

27   fuel adjustment mechanisms tend to weaken a company's

1   incentives or that such procedures may distort incentives

2   indicates to me that Dr. Wilson does not understand the

3   operation of the PJM System. Over the last 16 years,

4   Philadelphia Electric Company has had in place four very

5   different fuel adjustment clauses for recovery of fuel and

6   interchange expense and yet there has been no change in the

7   basic operation of the PJM economic dispatch system or the

8   requirements of the PJM contract. The conclusion that a

9   fuel adjustment clause drives the Company's incentive for

10   unit availability and performance is a most naive

11   conclusion. To the contrary, the performance of

12   Philadephia Electric Company's units and all other units on

13   the interconnection is the driving force with the fuel

14   adjustment clause acting only as an accounting mechanism

15   employed on an after-the-fact basis. While Dr. Wilson's

16   conclusion has a theoretical basis it lacks any practical

17   significance.

18   Dr. Wilson draws the conclusion that a fuel adjustment

19   clause that accounts for changes in generation mix has no

20   financial incentive for a utility to economize on the use

21   of fuel. This discussion leads the reader to believe that

22   the converse is true, that is, a utility has a financial

23   incentive to maximize its use of fuel and to incur little

24   or no maintenance expense on its own system. This again is

25   an absurd conclusion since there is no benefit to the

26   utility to utilize more fuel or more expensive fuel. In

27   addition, based upon my review of the history of this

1   Company's expenditures for operation and maintenance

2   expense, other than fuel, shows that there has been

3   certainly no reduction in these costs of service. In fact,

4   one only has to review the historic data contained in

5   Exhibit TPH-1 to see that the Company has spent significant

6   dollars on its power production units over the three year

7   history and in each year these expenses have increased.

8   Since the current regulatory formula does not allow us to

9   reach beyond the end of our future test year to project

10 these increases, and because these expenses have shown

11 significant increases, I believe Dr. Wilson's speculation

12 that there is some distortion or abuse imposed by the fuel

13 adjustment clause is unfounded.

14 Q. Please address Dr. Wilson's discussion of generation mix

15 changes as reflected in a fuel adjustment clause.

16 A. Dr. Wilson's testimony seems to suggest that some

17 sub-optimal level of performance is achieved if a utility

18 is allowed to reflect changes in its generation mix through

19 a fuel adjustment clause. This conclusion again seems to

20 indicate that Dr. Wilson does not have a good understanding

21 of Philadelphia Electric and its relationship to the PJM

22 Interconnection. Generation mix can vary substantially

23 from projections based upon many factors other than the

24 performance of any one utility's generating units. For

25 instance, changes in weather, increases in sales,

26 availability of other interconnected units and outside

27 purchases can dramatically affect a utility's actual

1   generation mix as compared to any budget projection.

2   Dr. Wilson suggests that by fixing a utility's

3   generation mix at some particular standard forces that

4   utility to make greater efforts to minimize cost, and only

5   allowing recovery resulting from "severe operational

6   problems" in future base rate proceedings. This conclusion

7   seems to assume that all major unscheduled outages are

8   within the control of management and are therefore deemed

9   to be imprudent unless the utility can make the showing at

10   a later date to the contrary. My understanding of the

11   regulatory process is quite the opposite of that discussed

12   by Dr. Wilson. I believe the process assumes that a

13   utility's behavior and actions are prudent unless there is

14   a showing to the contrary. By fixing the generation supply

15   mix and not allowing for recovery of costs, except on a

16   prospective basis through base rate proceedings, Dr.

17   Wilson's proposal would force a utility to fight an uphill

18   battle for cost recovery only to break even at best. Such

19   a conclusion flies in the face of fair and equitable

20   regulation.

21 Q. Would you discuss Dr. Wilson's proposal to integrate his

22   specific nuclear performance incentive standard into the

23   Energy Cost Rate mechanism?

24 A. Yes. Many of the aspects of Dr. Wilson's proposal have

25   been addressed in my Rebuttal Statement No. 18D and I will

26   not repeat them here. I believe Dr. Wilson's proposal is

27   inequitable as well as impractical. He has recognized a

1   reasonable nuclear performance capacity factor of between

2   60% to 70% and yet he would employ a 65% capacity factor in

3   each and every year as a "reasonable" calculation base in

4   determining the generating plant mix. As I have previously

5   discussed, a fixed percentage capacity factor cannot be

6   achieved in any one twelve month period and it is certainly

7   unreasonable to assume so for calculation purposes.

8   Employment of a 65% capacity factor as a fixed input would

9   automatically distort the generating plant mix for all

10   units. This alone should dismiss Dr. Wilson's proposal as

11   unworkable.

12   Dr. Wilson's fixed percentage capacity factor for

13   nuclear units does not work in concert with the

14   Commission's 80%/20% mechanism. For example, if the

15   expectation of nuclear performance in a projected year were

16   60% and in fact, if the Company were to produce its total

17   energy requirements exactly as projected, the Company would

18   undercollect on a total energy recovery basis and would

19   lose dollars through non-reconciliation of 20% of energy

20   expenses. This result would occur even though Dr. Wilson

21   would find that the 60% average nuclear capacity factor was

22   within his reasonable operating band. The same conclusion

23   would also hold true, to the detriment of customers, if the

24   projected capacity factor for nuclear generation was 70%

25   and the Company was forced to employ a 65% target capacity

26   factor in the determination of its generating supply mix.

27   Dr. Wilson proposes a further inequity in his proposal

1   on page 41 of GEC Statement 1C where he would impose less
2   than full recovery of energy costs in an example where the
3   nuclear capacity factor fell below 60% at the same time
4   total energy expenses were below estimates. Under this
5   example, Dr. Wilson's essentially ignores the purpose of an
6   80%/20% mechanism which he himself recognizes as a
7   balancing of customer and Company interests. In this
8   example, customers would enjoy a net savings in energy
9   expense and at the same time would receive an additional
10   benefit, at the expense of stockholders, which on its face
11   is unreasonable. I would note that Dr. Wilson does not
12   propose a double benefit to stockholders under favorable
13   operating performance.
14 Q. What is your response to Dr. Wilson's proposal for 90 days
15   of review prior to implementation of a revised ECR?
16 A. It is my expectation that the primary review of the
17   Company's filing will be done by the Commission through
18   review by its Bureau of Audits. Under current procedures,
19   the Company files an estimated ECR 60 days prior to
20   effectiveness with the final charge or credit submitted 30
21   days before. If it is the Commission's desire to perform
22   additional reviews and if additional time is required, this
23   modification could be built into the Company's proposed
24   ECRF by requiring earlier submittals. However, by
25   requiring more lead time before the charge or credit is
26   implemented will necessitate longer term projections of
27   fuel costs, sales and generation mix which will contribute

1   to inaccuracies in estimated data.

2 Q. What comments do you have on Dr. Wilson's proposal to

3   change the phraseology in the Company's tariff from "firm"

4   to "unit" sales to other utilities?

5 A. This change is unnecessary and inappropriate. Currently,

6   the only sale of electricity that the Company makes on a

7   wholesale basis is to a wholly owned subsidiary, Conowingo

8   Power Company. Energy costs, clearing to Conowingo Power

9   Company through FERC tariffs, are based upon average system

10 costs, the same used for Pennsylvania jurisdictional

11 customers. Costs allocated to Conowingo Power Company in

12 the Company's current Energy Cost Rate are computed through

13 an allocation factor developed by the Bureau of Audits.

14 The Company currently has no unit sales to other utilities

15 and if at any time in the future such sales take place,

16 there would be a required revision to the Company's base

17 rates to remove that unit from the cost of service.

18 Q. Does that conclude your rebuttal testimony on this issue?

19 A. Yes.

20

21

22

23

24

25

26

27

APPENDIX A

Preliminary

Energy Cost Rate Factor Calculation

Statement No. 1

ENERGY COST RATE FACTOR

Preliminary

Energy Cost Rate Factor Applicable to Service
Rendered on June 27, 1986 and Thereafter*

Credit: ....(3.520) mills per kilowatt-hour

or

($0.003520) per kilowatt-hour

*Use prior to June 27, 1986 will be billed
under Energy Cost Rate No. 10

PHILADELPHIA ELECTRIC COMPANY

J. H. AUSTIN, JR., President

PHILADELPHIA ELECTRIC COMPANY

Computation of Energy Cost Rate Factor
Application Period: June 27, 1986 through June 1987
Computation Period: June 27, 1986 through June 1987

1. Energy Cost Rate Factor = $(\frac{F}{S_t} - B - \frac{E}{S_a}) \times \frac{1}{1-T}$

2. F = Cost of Energy (Schedule E-2, Sheet 2 of 3) $458,380,771

3. E = Estimated Net Under-Collection (Sch. E-4, 7 of 7) .... ($ 34,969,537)

4. S_t = Projected Sales for Comp. Period (Sch. E-2, Sh 3 of 3) ...... 28,298,319 MWh

5. S_a = Proj. Retail Sales For Comp. Period (Sch. E-2, Sh 3 of 3) ... 27,686,260 MWh

6. $\frac{F}{S_t} - \frac{E}{S_a}$ Projected Cost per kWh .... 17.461 m/kWh

7. B = Base Cost .... —   20.823 m/kWh

8. Excess Cost (Line 6 - Line 7) .... (3.362) m/kWh

9. $\frac{1}{1-T}$ (T = 4.5%) x   1.04712

10. Energy Cost Rate Factor - Calculated (Line 8 x Line 9) .....   (3.520) m/kWh

March 3, 1986

ELECTRIC GENERATION AND FUEL COST ESTIMATES

MWH	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
MWH						
OIL-PE STM.	168,000	155,000	153,000	116,000	157,000	197,000
COAL-PE STM.	274,000	316,000	202,000	198,000	162,000	217,000
COAL-NINEMTH	290,000	373,000	364,000	383,000	336,000	338,000
INT.COMB.	21,220	36,490	16,030	9,220	9,650	4,120
TOTAL FOSSIL	753,220	876,490	735,030	706,220	684,650	756,120
MWH NUCLEAR						
NET HYDRO	1,749,658	1,719,997	1,348,452	1,294,362	1,244,081	1,307,604
OTHER	23,000	(7,000)	1,000	50,000	76,000	143,000
	0	0	0	0	0	0
RECEIVED PJM	253,000	200,000	286,000	170,000	281,000	279,000
DELIV'D PJM	(122,000)	(190,000)	(104,000)	(85,000)	(120,000)	(114,000)
STEAM-HT PP	700	2,600	3,000	4,800	9,800	19,700
ME,PPL & DPL	16	16	16	16	16	16
2PARTY TRANS	205,000	200,000	196,000	211,000	210,000	228,000
INTCH & PUR	336,716	212,616	381,016	296,816	380,816	412,716
TOTAL OUTPUT	2,862,594	2,802,103	2,465,498	2,347,398	2,385,547	2,619,440
*********						
OIL-PE STM	8,742,000	8,111,000	8,085,000	6,657,000	8,079,000	9,956,000
COAL-PE STM	5,656,000	6,433,000	4,150,000	4,128,000	3,805,000	4,569,000
MINEMOUTH	4,179,000	5,257,000	5,153,000	5,459,000	4,803,000	4,894,000
INT.COMB	1,375,900	2,239,200	1,012,800	547,500	598,400	244,500
TOTAL FOSSIL	19,952,900	22,040,200	18,400,800	16,591,500	17,285,400	19,663,500
(NUCLEAR EXCLUDING INTEREST, BUT INCLUDING OIL)						
NUCLEAR.	12,900,097	12,712,461	10,067,218	9,911,556	9,439,985	9,987,050
OTHER	0	0	0	0	0	0
RECEIVED PJM	7,556,000	6,926,000	9,091,000	6,412,000	8,339,000	9,221,000
DELIV'D PJM	(5,667,000)	(8,164,000)	(4,620,000)	(3,396,000)	(5,877,000)	(5,345,000)
STEAM-HT PP	24,000	90,000	105,000	170,000	345,000	756,000
ME,PPL & DPL	1,196	1,196	1,196	1,196	1,196	1,196
2PARTY TRANS	5,546,000	5,458,000	5,335,000	5,758,000	5,693,000	6,097,000
INTCH & PUR	7,460,196	6,331,196	9,912,196	8,945,196	8,501,196	10,730,196
$-FIN.CHGS	40,293,193	35,083,857	38,380,214	35,448,252	35,226,581	40,380,746
(GAS $ INCLUDED IN COAL-PE STM)						
TOTAL GAS	545,000	625,000	354,000	315,000	107,000	0

ELECTRIC GENERATION AND FUEL COST ESTIMATES

MWH

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
OIL-PE STM.	278,000	159,000	119,000	102,000	86,000	139,000	1,829,000
COAL-PE STM.	351,000	271,000	289,000	267,000	254,000	246,000	3,065,000
COAL-MINEMTH	362,000	315,000	303,000	376,000	355,000	355,000	4,078,000
INT.COMB.	11,610	12,820	2,850	13,540	3,830	7,170	146,550
TOTAL FOSSIL	1,002,610	757,820	713,850	665,540	719,850	747,170	9,118,550
MWH NUCLEAR	1,615,358	1,194,971	1,282,790	802,797	915,192	864,980	15,340,222
NET HYDRO	99,000	130,000	213,000	224,000	163,000	77,000	1,192,000
OTHER	0	0	0	0	0	0	0
TOTAL OUTPUT	2,729,964	2,637,607	2,504,856	2,264,953	2,324,638	2,553,366	30,297,964
RECEIVED PJM	123,000	265,000	239,000	397,000	578,000	691,000	3,562,000
DELIV'D PJM	(355,000)	(124,000)	(162,000)	(19,000)	(28,000)	(7,000)	(1,434,000)
STEAM-HT PP	22,000	14,600	11,200	4,600	1,600	2,200	97,000
ME,PPL & DPL	16	16	16	16	16	16	192
2PARTY TRANS	223,000	199,000	207,000	190,000	175,000	178,000	2,422,000
INTCH & PUR	13,016	354,816	295,216	572,616	526,616	866,216	4,647,192

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
OIL-PE STM	13,686,000	8,202,000	6,106,000	5,497,000	4,772,000	7,305,000	94,998,000
COAL-PE STM	7,455,000	5,767,000	6,225,000	5,707,000	5,478,000	5,302,000	64,655,000
MINEMOUTH	5,324,000	4,575,000	4,274,000	5,586,000	5,210,000		50,962,000
INT.COMB	709,500	773,700	170,700	861,100	639,000		9,205,300
TOTAL FOSSIL	27,174,500	19,317,700	16,775,700	16,313,100	18,256,000		227,820,300
(NUCLEAR EXCLUDING INTEREST, BUT INCLUDING OIL) NUCLEAR	12,165,597	9,135,427	9,850,891	5,984,621	6,786,589	6,350,323	115,267,615
OTHER	0	0	0	0	0	0	0
RECEIVED PJM	6,385,000	9,538,000	7,202,000	10,907,000	10,791,000	21,061,000	111,429,000
DELIV'D PJM	(17,372,000)	(6,410,000)	(6,795,000)	(1,010,000)	(913,000)	(364,000)	(65,913,000)
STEAM-HT PP	912,000	575,000	377,000	148,000	48,000	70,000	3,620,000
HE,PPL & DPL	1,280	1,280	1,280	1,280	1,280	1,280	14,856
2PARTY TRANS	5,956,000	5,335,000	5,652,000	5,269,000	5,012,000	5,031,000	66,142,000
INTCH & PUR	(6,117,720)	9,039,280	6,437,280	15,315,280	14,939,280	25,799,280	115,292,056
FIN.CHGS	33,200,377	37,492,407	33,063,871	37,612,801	37,792,869	50,405,603	458,580,771

(GAS $ INCLUDED IN COAL-PE STM)

TOTAL GAS	0	0	40,000	587,000	568,000	478,000	3,619,000

MAR 3 1986

Philadelphia Electric Company
Systems Sales – MWH
Estimated 7/1/86 – 6/30/87

	Retail (PECO) (1)	Resale (PECO Plus Interdepartment) (2)	Resale (SE to CP) (3)	Total Projected Sales (4)=(1)+(2)+(3)
July 1986	2,485,121	46,300	7,900	2,539,321
August	2,524,916	45,600	7,200	2,577,716
September	2,436,719	38,700	5,900	2,481,319
October	2,166,517	42,500	7,300	2,216,317
November	2,097,720	38,300	7,500	2,143,520
December	2,341,624	51,400	9,100	2,402,124
January 1987	2,529,691	52,317	9,800	2,591,808
February	2,409,857	43,647	8,300	2,461,804
March	2,278,774	44,454	8,500	2,331,728
April	2,195,196	40,221	6,400	2,241,817
May	2,024,831	38,404	6,400	2,069,635
June	2,195,294	39,416	6,500	2,241,210
12-Month Total	27,686,260	521,259	90,800	28,298,319

March 3, 1986

MMH DISTRIBUTION

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
OIL						
PE REHEAT OIL						
SCHUYLKILL#1	27,000	21,000	23,000	4,000	20,000	21,000
EDDYSTONE#3	53,000	37,000	44,000	42,000	39,000	43,000
EDDYSTONE#4	46,000	54,000	53,000	36,000	34,000	32,000
CROMBY#2	0	0	0	0	45,000	59,000
DELAWARE#7	23,000	20,000	18,000	20,000	18,000	22,000
DELAWARE#8	19,000	23,000	15,000	14,000	1,000	20,000
MMH R H OIL	168,000	155,000	153,000	116,000	157,000	197,000
PE MARGINAL OIL						
RICHMOND#9	0	0	0	0	0	0
MMH MARG OIL	0	0	0	0	0	0
SOUTHWARK#1	0	0	0	0	0	0
SOUTHWARK#2	0	0	0	0	0	0
REHEAT & MARGINAL OIL						
MMH OIL	168,000	155,000	153,000	116,000	157,000	197,000
PE COAL						
EDDYSTONE#1	106,000	117,000	114,000	128,000	120,000	105,000
EDDYSTONE#2	116,000	138,000	30,000	0	0	40,000
CROMBY#1	52,000	59,000	58,000	70,000	62,000	72,000
MMH COAL	274,000	314,000	202,000	198,000	182,000	217,000
PHILA. AREA OIL AND COAL.						
PHILA STEAM	442,000	469,000	355,000	314,000	339,000	414,000
MEMO - STATION TOTALS						
EDDYSTONE	321,000	346,000	241,000	206,000	193,000	220,000
CROMBY	52,000	59,000	58,000	70,000	107,000	131,000
DELAWARE7&8	42,000	43,000	33,000	36,000	19,000	42,000
SOUTHWARK1&2	0	0	0	0	0	0

M*H DISTRIBUTION

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
OIL							
PE REHEAT OIL							
SCHUYLKILL#1	42,000	24,000	---	13,000	9,000	14,000	238,000
EDDYSTONE#3	75,000	20,000	16,000	25,000	17,000	41,000	452,000
EDDYSTONE#4	70,000	67,000	15,000	13,000	23,000	22,000	465,000
CROMBY#2	45,000	13,000	47,000	34,000	30,000	42,000	315,000
DELAWARE#7	30,000	17,000	11,000	9,000	3,000	12,000	203,000
DELAWARE#8	16,000	18,000	10,000	8,000	4,000	8,000	156,000
M*H R H OIL	278,000	159,000	119,000	102,000	86,000	139,000	1,829,000
PE MARGINAL OIL							
RICHMOND#9	0	0	0	0	0	0	0
SOUTHWARK#1	0	0	0	0	0	0	0
SOUTHWARK#2	0	0	0	0	0	0	0
M*H MARG OIL	0	0	0	0	0	0	0
REHEAT & MARGINAL OIL							
M*H OIL	278,000	159,000	119,000	102,000	86,000	139,000	1,829,000
PE COAL							
EDDYSTONE#1	122,000	110,000	105,000	115,000	105,000	99,000	1,346,000
EDDYSTONE#2	146,000	96,000	131,000	125,000	126,000	96,000	1,044,000
CROMBY#1	85,000	65,000	53,000	27,000	23,000	51,000	675,000
M*H COAL	351,000	271,000	289,000	267,000	254,000	246,000	3,065,000
PHILA. AREA OIL AND COAL							
PHILA STEAM	629,000	430,000	408,000	369,000	340,000	385,000	4,894,000
MEMO - STATION TOTALS							
EDDYSTONE	413,000	293,000	267,000	278,000	271,000	258,000	3,307,000
CROMBY	128,000	78,000	100,000	61,000	53,000	93,000	990,000
DELAWARE7&8	46,000	35,000	21,000	17,000	20,000	20,000	359,000
SOUTHWARK1&2	0	0	0	0	0	0	0

MAR 3 1986

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
MINEMOUTH (PE SHARE)						
KEYSTONE#1	107,000	108,000	95,000	109,000	96,000	90,000
KEYSTONE#2	13,000	84,000	88,000	96,000	85,000	90,000
KEYSTONE STA	120,000	192,000	183,000	205,000	179,000	180,000
CONEMAUGH#1	81,000	95,000	86,000	86,000	79,000	85,000
CONEMAUGH#2	89,000	86,000	95,000	92,000	78,000	73,000
CONEMAUGH STA	170,000	181,000	181,000	178,000	157,000	158,000
MINEMOUTH	290,000	373,000	364,000	383,000	336,000	338,000
PHILA. AREA OIL & COAL, AND MINEMOUTH COAL.						
FOSSIL STEAM	732,000	842,000	719,000	697,000	675,000	752,000
NUCLEAR (PE SHARE)						
PEACH BOT#2	258,117	281,339	252,759	216,140	290,270	208,102
PEACH BOT#3	229,541	272,658	206,693	188,222	132,811	266,502
PCH BOT STA	487,658	553,997	459,452	404,362	423,081	474,604
SALEM#1	282,000	264,000	242,000	247,000	247,000	247,000
SALEM#2	317,000	273,000	136,000	0	275,000	21,000
SALEM STA	599,000	537,000	378,000	247,000	275,000	268,000
LIM1	663,000	629,000	511,000	643,000	546,000	565,000
LIM2	0	0	0	0	0	0
LIM STA	663,000	629,000	511,000	643,000	546,000	565,000
MWH NUCLEAR	1,749,658	1,719,997	1,348,452	1,294,362	1,244,081	1,307,604
OTHER (PRECOMMERCIAL)						
LIMERICK 1	0	0	0	0	0	0
LIMERICK 2	0	0	0	0	0	0
OTHER	0	0	0	0	0	0

MAR 3 1986

MWH DISTRIBUTION

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
MINEMOUTH (PE SHARE)							
KEYSTONE#1	93,000	90,000	111,000	21,000	67,000	101,000	1,086,000
KEYSTONE#2	81,000	81,000	94,000	92,000	107,000	92,000	1,003,000
KEYSTONE STA	174,000	171,000	205,000	113,000	174,000	193,000	2,089,000
CONEMAUGH#1	96,000	82,000	92,000	87,000	101,000	86,000	1,056,000
CONEMAUGH#2	92,000	62,000	6,000	85,000	101,000	76,000	933,000
CONEMAUGHISTA	188,000	144,000	98,000	170,000	202,000	162,000	1,989,000
MINEMOUTH	362,000	315,000	303,000	283,000	376,000	355,000	4,078,000
PHILA. AREA OIL & COAL, AND MINEMOUTH COAL.							
FOSSIL STEAM	991,000	745,000	711,000	652,000	716,000	740,000	8,972,000
NUCLEAR (PE SHARE)							
PEACH BOT#2	276,873	14,290	0	0	248,293	275,980	2,322,163
PEACH BOT#3	259,465	228,681	237,790	246,797	156,899	0	2,426,059
PCH BOT STA	536,338	242,971	237,790	246,797	405,192	275,980	4,748,222
SALEM#1	263,000	257,000	283,000	281,000	300,000	287,000	3,228,000
SALEM#2	255,000	209,000	207,000	275,000	210,000	302,000	2,205,000
SALEM STA	518,000	466,000	490,000	556,000	510,000	589,000	5,433,000
LIM1	561,000	486,000	555,000	0	0	0	5,159,000
LIM2	0	0	0	0	0	0	0
LIM STA	561,000	486,000	555,000	0	0	0	5,159,000
MWH NUCLEAR	1,615,338	1,194,971	1,282,790	802,797	915,192	864,980	15,340,222
OTHER (PRECOMMERCIAL)							
LIMERICK 1	0	0	0	0	0	0	0
LIMERICK 2	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0

MAR 3 1986

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
DIESELS						
CROYBY D 1&2	20	0	0	0	40	
DELAWARE D	30	20	0	20	40	
SOUTHMARK D	0	0	0	0	0	
SCHUYLKILL D	0	0	20	10	0	
PE DIESELS	50	20	20	30	140	40
KEYSTONE D	10	20	10	0	0	
CONEMAUGH D	10	10	10	0	0	
DIESEL	70	50	40	30	160	40
GAS TURBINES						
RICH GE CT	5,250	7,730	2,710	1,290	2,710	280
RICH NE CT	0	0	0	0	0	0
RICH MO CT	0	0	0	0	0	0
RICH CT TOTAL	5,250	7,730	2,710	1,290	2,710	280
SOUTHMARK CT	210	740	400	0	0	0
EDDYSTONE CT	300	820	360	0	0	0
DELAWARE CT	270	750	370	0	0	0
SCHUYLKILL CT	100	450	100	0	0	0
CHESTER CT	210	480	300	0	0	0
FALLS CT	240	670	290	0	0	0
MOSER CT	240	780	330	0	0	0
PLY MTG CT	0	0	0	0	0	0
SUBTOTAL	6,820	12,420	4,860	1,290	2,710	280
CROYDON	14,300	22,000	11,100	7,900	6,800	3,800
GAS TURBINES	21,120	34,420	15,960	9,190	9,510	4,080
SALEM CT	30	20	30	0	0	0
TOTAL CT	21,150	34,440	15,990	9,190	9,510	4,080
TOTAL CT AND DIESEL	21,220	34,490	16,030	9,220	9,650	4,120
TOTAL IC						
SIMPLE CYCLE (INC. SALEM CT)	6,850	12,440	4,890	1,290	2,710	280
CT TOTAL						

MAR 3 1986

MWH DISTRIBUTION

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
DIESELS							
CROMBY D 1&2	0	70	10	0	0	0	240
DELAWARE D	170	40	0	50	0	0	370
SOUTHWARK D	0	0	0	0	0	0	0
SCHUYLKILL D	40	0	0	0	0	0	70
PE DIESELS	210	110	10	50	0	0	680
KEYSTONE D	0	0	0	10	0	0	50
CONEMAUGH D	0	0	0	10	0	0	40
DIESEL	210	110	10	70	0	0	770
GAS TURBINES							
RICH GE CT	1,300	1,010	140	3,420	830	1,470	28,140
RICH ME CT	0	0	0	0	0	0	0
RICH WO CT	0	0	0	0	0	0	0
RICHCT TOTAL	1,300	1,010	140	3,420	830	1,470	28,140
SOUTHWARK CT	0	0	0	120	0	0	1,470
EDDYSTONE CT	0	0	0	120	0	0	1,600
DELAWARE CT	0	0	0	250	0	0	1,640
SCHUYLKILLCT	0	0	0	30	0	0	680
CHESTER CT	0	0	0	180	0	0	1,170
FALLS CT	0	0	0	140	0	0	1,340
MOSER CT	0	0	0	210	0	0	1,560
PLY MTG CT	0	0	0	0	0	0	1,560
SUBTOTAL	1,300	1,010	140	4,470	830	1,470	37,600
CROYDON	10,100	11,700	2,700	9,000	3,000	5,700	108,100
GAS TURBINES	11,400	12,710	2,840	13,470	3,830	7,170	145,700
TOTAL CT	11,400	12,710	2,840	13,470	3,830	7,170	145,780
SALEM CT	0	0	0	0	0	0	80
TOTAL IC	11,400	12,710	2,840	13,470	3,830	7,170	145,700
TOTAL CT AND DIESEL	11,610	12,820	2,850	13,540	3,830	7,170	146,550
SIMPLE CYCLE (INC. SALEM CT) CT TOTAL	1,300	1,010	140	4,470	830	1,470	37,680

MAR 3 1986

FUEL COST

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
OIL (NO. 6 & NO. 2)						
SCHUYLKILL#1	1,207,000	928,000	1,038,000	204,000	886,000	956,000
EDDYSTONE1&2	178,000	163,000	182,000	187,000	158,000	203,000
EDDYSTONE3&4	5,382,000	5,018,000	5,294,000	4,424,000	4,186,000	4,356,000
EDDY 1,2,3,4	5,560,000	5,181,000	5,476,000	4,611,000	4,344,000	4,559,000
ED (SULFUR)	0	0	0	0	209,000	396,000
EDDYSTONE	5,560,000	5,181,000	5,476,000	4,611,000	4,553,000	4,955,000
CROMBY#1	16,000	13,000	14,000	11,000	10,000	11,000
CROMBY#2	34,000	34,000	33,000	34,000	1,916,000	2,485,000
CR (SULFUR)	137,000	154,000	151,000	184,000	164,000	189,000
CROMBY	187,000	201,000	198,000	229,000	2,090,000	2,685,000
DELAWARE 788	1,925,000	1,955,000	1,526,000	1,597,000	923,000	1,945,000
RICHMOND	0	0	0	0	0	0
SOUTHWARK1&2	0	0	0	0	0	0
TOTAL OIL	8,879,000	8,265,000	8,236,000	6,641,000	8,452,000	10,541,000
COAL						
EDDYSTONE#1	1,914,000	2,100,000	2,072,000	2,365,000	2,201,000	1,943,000
EDDYSTONE#2	2,111,000	2,513,000	547,000	0	0	743,000
EDDYSTONE	4,025,000	4,613,000	2,619,000	2,365,000	2,201,000	2,686,000
CROMBY#1	929,000	1,061,000	1,026,000	1,266,000	1,124,000	1,298,000
TOTAL PECOAL	4,954,000	5,654,000	3,645,000	3,629,000	3,325,000	3,984,000
GAS FOR SCRUBBER						
EDDYSTONE#1	261,000	286,000	280,000	315,000	107,000	0
EDDYSTONE#2	284,000	339,000	74,000	0	0	0
TOTAL GAS	545,000	625,000	354,000	315,000	107,000	0
TOTAL OIL, TOTAL COAL & TOTAL GAS	14,378,000	14,544,000	12,235,000	10,585,000	11,884,000	14,525,000
PHILA STEAM						

FUEL COST

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
OIL (NO.6 & NO.2)							
SCHUYLKILL#1	1,845,000	1,033,000	885,000	587,000	398,000	624,000	10,591,000
EDDYSTONE1&2	206,000	180,000	188,000	157,000	187,000	215,000	2,200,000
EDDYSTONE3&4	7,635,000	6,710,000	2,016,000	2,522,000	3,661,000		51,619,000
EDDY 1,2,3,4	7,839,000	4,890,000	2,204,000	2,709,000	3,874,000		53,819,000
ED (SULFUR)	727,000	550,000	599,000	0	0		2,489,000
EDDYSTONE	8,566,000	5,448,000	2,803,000	2,572,000	2,709,000	3,874,000	56,308,000
CROWBY#1	6,000	9,000	16,000	10,000	7,000	14,000	135,000
CROWBY#2	1,884,000	621,000	1,997,000	1,465,000	1,292,000	1,793,000	13,588,000
CR (SULFUR)	218,000	172,000	139,000	71,000	59,000	135,000	1,773,000
CROWBY	2,108,000	802,000	2,150,000	1,596,000	1,358,000	1,942,000	15,496,000
TOTAL OIL	14,631,000	8,932,000	6,844,000	5,568,000	4,831,000	7,440,000	99,260,000
COAL							
DELAWARE 7&8	2,112,000	1,649,000	1,006,000	863,000	366,000	1,000,000	16,865,000
RICHMOND	0	0	0	0	0	0	0
SOUTHWARK1&2	0	0	0	0	0	0	0
CROWBY#1	1,513,000	1,197,000	976,000	510,000	427,000	959,000	12,264,000
EDDYSTONE	4,997,000	3,840,000	4,471,000	4,539,000	4,424,000	3,730,000	44,510,000
EDDYSTONE#2	2,724,000	1,804,000	2,482,000	2,413,000	1,850,000		19,564,000
EDDYSTONE#1	2,273,000	2,036,000	1,989,000	2,162,000	2,011,000	1,880,000	24,946,000
TOTAL PECOAL	6,510,000	5,037,000	5,447,000	5,049,000	4,851,000	4,689,000	56,774,000
GAS FOR SCRUBBER							
EDDYSTONE#1	0	0	17,000	281,000	258,000	242,000	2,047,000
EDDYSTONE#2	0	0	23,000	306,000	310,000	256,000	1,572,000
TOTAL GAS	0	0	40,000	587,000	568,000	478,000	3,619,000
TOTAL OIL, TOTAL COAL & TOTAL GAS							
PHILA STEAM	21,141,000	13,969,000	12,331,000	11,204,000	10,250,000	12,607,000	159,655,000

MAR 3 1986

FUEL COST

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
MINEMOUTH (PE SHARE)						
KEYSTN1 COAL	1,349,000	1,361,000	1,196,000	1,404,000	1,208,000	1,160,000
KEYSTN2 COAL	164,000	1,056,000	1,112,000	1,225,000	1,094,000	1,155,000
KEYSTONE C	1,513,000	2,415,000	2,308,000	2,629,000	2,302,000	2,315,000
KEYST1&2 OIL	8,000	17,000	16,000	0	8,000	42,000
KEYSTONE	1,521,000	2,632,000	2,324,000	2,629,000	2,310,000	2,357,000
CON1 COAL	1,268,000	1,483,000	1,346,000	1,359,000	1,249,000	1,344,000
CON2 COAL	1,383,000	1,335,000	1,476,000	1,457,000	1,230,000	1,165,000
CONEMAUGH C	2,651,000	2,818,000	2,822,000	2,816,000	2,479,000	2,509,000
CON1&2 OIL	7,000	7,000	7,000	14,000	14,000	28,000
CONEMAUGH	2,658,000	2,825,000	2,829,000	2,830,000	2,493,000	2,557,000
MINEMOUTH	4,179,000	5,257,000	5,153,000	5,459,000	4,803,000	4,894,000
NUCLEAR (PE SHARE)						
PB2 NUCLEAR	1,786,023	1,946,704	1,748,944	1,495,563	2,008,504	1,639,943
PB3 NUCLEAR	1,739,222	2,065,905	1,566,089	1,426,141	1,006,296	2,019,255
PB2&3INTREST	816,540	785,468	754,396	723,324	692,252	661,180
PB ATOMIC	4,341,785	4,798,077	4,069,429	3,645,028	3,707,052	4,120,378
AUX BOILER	28,034	28,034	27,130	28,034	27,130	28,034
PB DIESEL	4,434	4,434	4,290	4,434	4,290	4,434
SALEM 1	2,088,000	1,953,000	1,795,000	1,830,000	2,053,000	1,831,000
SALEM 2	1,976,000	1,703,000	848,000	0	152,000	152,000
SLM1INTEREST	481,915	466,511	451,107	435,703	420,299	404,895
SLM2INTEREST	257,186	246,549	235,913	235,913	235,913	508,291
SALEM AUX&BLR	0	0	0	0	0	0
SALEM DIESEL	200	200	200	200	200	200
LM1 NUCLEAR	5,228,000	4,961,000	4,029,000	5,077,000	4,312,000	4,462,000
LM2 NUCLEAR	0	0	0	0	0	0
LM NUC TOTAL	5,228,000	4,961,000	4,029,000	5,077,000	4,312,000	4,462,000
LM AUX&BOILER	43,158	43,158	41,766	43,158	41,766	43,158
LM DIESEL	7,026	7,026	6,799	7,026	6,799	7,026
NUCLEAR	14,455,736	14,210,989	11,508,654	11,306,496	10,788,449	11,561,416
NOTE: FOR JIM MILLER						
SALEM JC2	0	0	0	0	0	0
OTHER (PRECOMMERCIAL)						
OTHER	0	0	0	0	0	0

= MAR 3 1986

MAR 3 1986

FUEL COST

MINEMOUTH (PE SHARE)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
KEYSTN1 COAL	1,208,000	1,177,000	1,449,000	271,000	883,000	1,335,000	13,999,000
KEYSTN2 COAL	1,057,000	1,056,000	1,210,000	1,408,000	1,408,000	1,214,000	12,976,000
KEYSTONE C	2,265,000	2,233,000	2,676,000	2,291,000	2,291,000	2,547,000	26,975,000
KEYSTN1&2 OIL	25,000	16,000	0	0	8,000	0	140,000
KEYSTONE	2,290,000	2,269,000	2,676,000	2,299,000	2,299,000	2,547,000	27,115,000
CON1 COAL	1,542,000	1,325,000	1,489,000	1,648,000	1,648,000	1,400,000	16,859,000
CON2 COAL	1,478,000	996,000	1,352,000	1,659,000	1,242,000	1,242,000	16,855,000
CONEMAUGH C	3,020,000	2,319,000	2,760,000	3,287,000	3,287,000	2,642,000	31,714,000
CON1&2 OIL	16,000	7,000	7,000	7,000	21,000	0	133,000
CONEMAUGH	3,034,000	2,326,000	2,767,000	3,287,000	3,287,000	2,663,000	31,847,000
MINEMOUTH	5,324,000	4,575,000	4,274,000	4,248,000	5,586,000	5,210,000	58,962,000

NUCLEAR (PE SHARE)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
PB2 NUCLEAR	1,915,804	98,880	0	0	1,798,577	1,999,138	16,238,080
PB3 NUCLEAR	1,965,941	1,732,694	1,802,039	1,875,236	1,192,160	0	18,390,978
PB2&3INTREST	632,414	603,650	587,905	572,159	946,210	910,176	8,685,674
PB ATOMIC	4,514,159	2,435,224	2,389,944	2,447,395	3,936,997	2,909,314	45,314,732
AUX BOILER	28,034	25,320	28,034	27,130	28,034	27,130	330,078
PB DIESEL	4,434	4,006	4,434	4,290	4,434	4,290	52,204
SALEM 1	1,946,000	1,906,000	2,095,000	2,081,000	2,223,000	2,129,000	23,910,000
SALEM 2	1,805,000	1,481,000	1,668,000	1,958,000	1,488,000	2,142,000	15,011,000
SLM1INTEREST	389,691	374,087	358,683	363,279	327,876	312,472	4,766,318
SLM2INTEREST	491,650	475,430	458,999	442,568	426,130	409,707	4,424,465
SALEM AUXBLR	0	0	0	0	0	0	0
SALEM DIESEL	200	200	200	200	200	200	2,400
LM1 NUCLEAR	4,428,000	3,842,000	4,403,000	0	0	0	40,742,000
LM2 NUCLEAR	0	0	0	0	0	0	0
LM NUC TOTAL	4,428,000	3,842,000	4,403,000	0	0	0	40,742,000
LM1&2BOILER	43,158	38,981	43,158	41,766	43,158	41,766	508,151
LM DIESEL	7,026	6,346	7,026	6,799	7,026	6,799	82,724
NUCLEAR	15,657,362	10,580,594	11,256,478	7,342,427	8,484,613	7,982,678	133,144,072

NOTE: FOR JIM MILLER

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
SALEM JC2	0	0	0	0	0	0	0
OTHER (PRECOMMERCIAL)	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0

FUEL COST

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
DIESELS						
CROSBY D 1&2	1,400	0	0	0	6,000	2,500
DELAWARE D	1,700	1,400	0	0	2,400	0
SOUTHWARK D	0	0	0	1,100	0	0
SCHUYLKILL D	0	0	0	400	0	0
KEYSTONE D	400	1,000	800	0	0	0
CONEMAUGH D	400	800	600	0	0	0
DIESEL	3,900	3,200	2,800	1,500	8,400	2,500
GAS TURBINES						
SOUTHWARK CT	17,000	59,000	30,000	0	0	0
EDDYSTONE CT	25,000	67,000	28,000	0	0	0
DELAWARE CT	22,000	60,000	29,000	0	0	0
SCHUYLKILL CT	9,000	35,000	8,000	0	0	0
CHESTER CT	17,000	38,000	23,000	0	0	0
FALLS CT	20,000	53,000	23,000	0	0	0
MOSER CT	20,000	62,000	26,000	0	0	0
PLY MTG CT	0	0	0	0	0	0
RICH GE CT	346,000	509,000	179,000	86,000	179,000	19,000
RICH NE CT	0	0	0	0	0	0
RICH MO CT	0	0	0	0	0	0
RICHMOND CT	346,000	509,000	179,000	86,000	179,000	19,000
CROYDON	893,000	1,352,000	661,000	460,000	411,000	225,000
SALEM CT	3,000	1,000	3,000	0	0	0
GAS TURBINES	1,372,000	2,236,000	1,010,000	546,000	590,000	242,000
TOTAL IC	1,375,900	2,239,200	1,012,800	547,500	598,400	244,500

FUEL COST

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
DIESELS							
CROSBY D 1&2	0	4,300	700	0			14,900
DELAWARE D	10,100	2,400	0	3,100			22,200
SOUTHWARK D	0	0	0	0			0
SCHUYLKILL D	2,400	0	0	0			4,200
KEYSTONE D	0	0	0	600			2,800
CONEMAUGH D	0	0	0	400			2,200
DIESEL	12,500	6,700	700	4,100			46,300
GAS TURBINES							
SOUTHWARK CT	0	0	0	10,000	0	0	116,000
EDDYSTONE CT	0	0	0	10,000	0	0	130,000
DELAWARE CT	0	0	0	21,000	0	0	132,000
SCHUYLKILLCT	0	0	0	3,000	0	0	55,000
CHESTER CT	0	0	0	15,000	0	0	93,000
FALLS CT	0	0	0	12,000	0	0	108,000
MOSER CT	0	0	0	17,000	0	0	125,000
PLY MTG CT	0	0	0	0	0	0	
RICH GE CT	87,000	67,000	10,000	225,000	55,000	97,000	1,859,000
RICH NE CT	0	0	0	0	0	0	0
RICH MO CT	87,000	67,000	10,000	225,000	55,000	97,000	1,859,000
RICHMOND CT	67,000	67,000	10,000				
CROYDON	610,000	700,000	160,000	544,000	178,000	342,000	6,534,000
SALEM CT	0	0	0	0	0	0	7,000
GAS TURBINES	697,000	767,000	170,000	857,000	233,000	439,000	9,159,000
TOTAL IC	709,500	775,700	170,700	861,100	233,000	439,000	9,205,300

= MAR 3 1986

FUEL BURN (6 OIL BBLS.)

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
EDDYSTONE STATION						
ED1 #6OIL	2,100	2,100	2,300	2,300	2,100	2,300
ED1 SCR OIL	0	0	0	0	7,700	10,600
ED2 #6OIL	2,100	2,100	2,300	2,300	9,800	8,900
ED2 SCR OIL	0	0	0	0	0	4,000
ED1&2 #6OIL	4,200	4,200	4,600	4,600	11,900	11,200
ED12 SCR OIL	0	0	0	0	7,700	14,600
ED3 #6OIL	104,000	86,000	89,000	86,000	81,000	90,000
ED4 #6OIL	92,000	77,000	104,000	75,000	72,000	69,000
-----STATION TOTALS-----						
ED12 SCR OIL	0	0	0	0	7,700	14,600
ED1234 #6OIL	200,200	197,200	197,600	165,600	164,900	170,200
ED324 #6OIL	196,000	163,000	193,000	161,000	153,000	159,000
ED STA #6OIL	200,200	187,200	197,600	165,600	172,600	184,800
CROSBY STATION						
CR1 #6OIL	410	360	360	290	290	290
CR1 SCRUBOIL	5,200	5,900	5,800	7,100	6,300	7,200
CR2 #6OIL	1,310	1,310	1,270	1,310	73,270	95,040
-----STATION TOTALS-----						
SCRUBBEROIL	5,200	5,900	5,800	7,100	6,300	7,200
CR12 #6OIL	1,720	1,670	1,630	1,600	73,560	95,330
CR STA #6OIL	6,920	7,570	7,430	8,700	79,860	102,530
DEL7 #6OIL	37,000	33,000	29,000	33,000	30,000	36,000
DEL8 #6OIL	32,000	38,000	26,000	25,000	3,000	34,000
DEL STA 6OIL	69,000	71,000	55,000	58,000	33,000	70,000
SWK1 #6OIL	0	0	0	0	0	0
SWK2 #6OIL	0	0	0	0	0	0
SWK STA 6OIL	0	0	0	0	0	0
RICH9 #6OIL	0	0	0	0	0	0
SOUTHWARK STATION						
SKR1 #6OIL	0	0	0	0	0	0
SKR2 #6OIL	0	0	0	0	0	0
SCHUY1 #6OIL	44,000	36,000	38,000	7,000	32,000	35,000
TOTAL #6OIL FOR ALL STEAM UNITS:	320,120	299,770	298,030	239,300	317,460	392,530

FUEL BURN (6 OIL BBLS.)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
EDDYSTONE STATION							
ED1 #6OIL	2,400	2,000	2,300	2,100	2,300	2,300	26,600
ED1 SCR OIL	12,200	11,000	9,900	0	0	0	51,400
ED2 #6OIL	0	3,400	0	2,100	2,300	2,300	37,600
ED2 SCR OIL	14,600	9,600	12,200	0	0	0	40,400
ED12 #6OIL	2,400	5,400	2,300	4,200	4,600	4,600	64,200
ED12 SCR OIL	26,800	20,600	22,100	0	0	0	91,800
ED3 #6OIL	144,000	43,000	38,000	55,000	41,000	84,000	932,000
ED4 #6OIL	135,000	129,000	35,000	33,000	52,000	49,000	951,000
ED34 #6OIL	279,000	172,000	73,000	73,000	95,000	133,000	1,883,000
----STATION TOTALS----							
ED12 SCR OIL	26,800	20,600	22,100	0	0	0	91,800
ED1234 #6OIL	281,400	177,400	75,300	92,200	97,600	137,600	1,947,200
ED STA #6OIL	308,200	198,000	97,600	92,200	97,600	137,600	2,039,000
CROMBY STATION							
CR1 #6OIL	180	250	380	270	180	390	3,650
CR1 SCRUBOIL	8,300	6,600	5,300	2,700	5,200	5,200	67,900
CR2 #6OIL	72,090	23,720	76,380	55,960	49,370	68,550	519,580
CR STA #6OIL	80,570	30,570	82,060	58,930	51,850	74,160	591,130
----STATION TOTALS----							
SCRUBBEROIL	8,300	6,600	5,300	2,700	5,200	5,200	67,900
CR12 #6OIL	72,270	23,970	76,760	56,230	49,550	68,940	523,230
DEL7 #6OIL	49,000	29,000	19,000	16,000	6,000	21,000	338,000
DEL8 #6OIL	28,000	31,000	17,000	15,000	7,000	15,000	271,000
DEL STA 6OIL	77,000	60,000	36,000	31,000	13,000	36,000	609,000
RICH9 #6OIL	0	0	0	0	0	0	0
SOUTHWARK STATION							
SWK1 #6OIL	0	0	0	0	0	0	0
SWK2 #6OIL	0	0	0	0	0	0	0
SWK STA 6OIL	0	0	0	0	0	0	0
SCHUY1 #6OIL	67,000	38,000	21,000	14,000	23,000	25,000	385,000
=TOTAL #6OIL FOR ALL STEAM UNITS:							
STEAM #6OIL	532,770	326,570	247,460	203,130	176,850	270,740	3,624,130

FUEL BURN (6 OIL BBLS.)	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
PEACH BOTTOM AUX. BOILER (PE SHARE ONLY)						
PB2 #6OIL	537	537	520	537	520	537
PB3 #6OIL	537	537	520	537	520	537
PB STA 6OIL	1,074	1,074	1,040	1,074	1,040	1,074
NUCL #6OIL	1,074	1,074	1,040	1,074	1,040	1,074
TOTAL 6OIL FOR ALL ELECTRIC OUTPUT:						
ELECTRIC	321,194	300,844	299,070	240,374	318,500	393,404
STEAM HEAT ('SCHUYLKILL' TRANSFER, MILLOM & EDISON)						
TRANSFER	27,700	38,500	34,900	43,100	71,100	150,500
MILLOM	0	0	0	0	0	0
EDISON	8,545	2,568	872	892	1,983	4,028
TOTAL STEAM	35,245	41,068	35,772	43,992	73,083	154,525
PEACH BOTTOM AUX. BOILER (PS, AE, DPL SHARES)						
PB2AUX NONPE	727	727	704	727	704	727
PB3AUX NONPE	727	727	704	727	704	727
PB AUX NONPE	1,454	1,454	1,408	1,454	1,408	1,454
TOTAL BARRELS TO BE PURCHASED						
NO 6 OIL	358,893	343,366	336,250	285,820	392,991	549,386

FUEL BURN   (6 OIL BBLS.)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
PEACH BOTTOM AUX. BOILER (PE SHARE ONLY)							
PB2 #6OIL	557	485	537	520	537	520	6,324
PB3 #6OIL	557	485	537	520	537	520	6,324
PB STA 6OIL	1,074	970	1,074	1,040	1,074	1,040	12,648
NUCL #6OIL	1,074	970	1,074	1,040	1,074	1,040	12,648
TOTAL 6OIL FOR ALL ELECTRIC OUTPUT							
ELECTRIC	553,844	327,540	248,534	204,170	177,524	271,780	3,636,778
STEAM HEAT (SCHUYLKILL TRANSFER, KILLOW & EDISON).							
TRANSFER KILLOW	196,800	184,500	170,800	120,800	55,700	43,900	1,136,300
	0	0	0	0	0	0	0
EDISON	8,082	17,273	8,306	2,734	994	751	57,008
TOTAL STEAM	202,882	201,773	179,106	123,534	56,694	44,651	1,193,308
PEACH BOTTOM AUX. BOILER (PS, AE, DPL SHARES)							
PB2AUX NONPE	727	657	727	704	727	704	8,552
PB3AUX NONPE	727	657	727	704	727	704	8,552
PB AUX NONPE	1,454	1,314	1,454	1,408	1,454	1,408	17,126
TOTAL BARRELS TO BE PURCHASED							
NO 6 OIL	738,180	530,627	429,094	329,112	235,672	317,819	4,847,210

FUEL BURN (# 2 OIL BBLS.)

STEAM STATIONS	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
ED1 #2OIL	700	700	1,300	1,300	700	1,300
ED2 #2OIL	1,100	700	700	700	700	1,100
ED3 #2OIL	800	600	700	700	700	800
ED4 #2OIL	700	800	800	600	600	500
ED STA #2OIL	3,300	2,800	3,500	3,300	2,700	3,700
CR1 #2OIL	140	120	130	100	100	100
CR2 #2OIL	0	0	0	0	0	120
CR STA #2OIL	140	120	130	100	100	220
DEL7 #2OIL	620	490	570	560	510	810
DEL8 #2OIL	530	510	400	570	180	680
DEL STA 2OIL	1,150	1,000	970	1,130	690	1,490
SMK STA 2OIL	0	0	0	0	0	0
SMK1 #2OIL	0	0	0	0	0	0
SMK2 #2OIL	0	0	0	0	0	0
RICH9 #2OIL	0	0	0	0	0	0
SCHUY1 #2OIL	150	120	150	60	110	160
PHILA AREA STEAM UNITS:						
PHL STM 2OIL	4,740	4,040	4,750	4,590	3,700	5,570
MINEMOUTH STATIONS						
KEYST1 #2OIL	0	0	300	0	0	800
KEYST2 #2OIL	300	500	300	0	300	500
KEY STA 2OIL	300	500	600	0	300	1,300
CON1 #2OIL	200	0	0	400	0	400
CON2 #2OIL	0	200	200	0	400	400
CON STA 2OIL	200	200	200	400	400	800
MINEMTH 2OIL	500	700	800	400	700	2,100
PHILA AREA & MINEMTH TOTAL:						
STEAM #2OIL	5,240	4,740	5,550	4,990	4,400	7,670

MAR 3 1986

FUEL BURN (#2 OIL BBLS.)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
STEAM STATIONS							
ED1 #20IL	1,300	600	1,300	700	1,300	1,300	12,500
ED2 #20IL	1,100	1,400	700	700	1,400	1,400	11,000
ED3 #20IL	1,200	300	400	300	700	700	7,500
ED4 #20IL	1,100	1,000	200	400	400	400	7,300
ED STA #20IL	4,700	3,300	2,500	2,000	2,700	3,800	38,300
CR1 #20IL	60	90	130	90	60	130	1,250
CR2 #20IL	50	70	100	110	100	100	750
CR STA #20IL	110	160	230	200	160	250	2,000
DEL7 #20IL	600	480	640	420	240	450	6,390
DEL8 #20IL	660	520	480	410	250	450	5,640
DEL STA 20IL	1,250	1,000	1,120	830	490	900	12,030
RICH9 #20IL	0	0	0	0	0	0	0
SWK1 #20IL	0	0	0	0	0	0	0
SWK2 #20IL	0	0	0	0	0	0	0
SWK STA 20IL	0	0	0	0	0	0	0
SCHUY1 #20IL	140	100	140	130	80	150	1,490
PHILA AREA STEAM UNITS:							
PHL STM 20IL	6,210	4,560	3,990	3,160	3,430	5,080	53,820
MINEMOUTH STATIONS							
KEYST1 #20IL	300	300	0	0	300	0	2,000
KEYST2 #20IL	500	300	0	0	0	0	2,700
KEY STA 20IL	800	600	0	0	300	0	4,700
CON1 #20IL	200	0	0	0	0	200	1,400
CON2 #20IL	200	200	200	200	0	400	2,400
CON STA 20IL	400	200	200	200	0	600	3,800
MINEMTH 20IL	1,200	800	200	200	300	600	8,500
PHILA AREA & MINEMTH TOTAL:							
STEAM #20IL	7,410	5,360	4,190	3,360	3,730	5,680	62,320

FUEL BURN (2 OIL BBLS.)

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
DIESEL FOR NUCLEAR UNITS						
PEACH BOTTOM (PE SHARE ONLY)						
PB2 #2OIL	67	67	64	67	64	67
PB3 #2OIL	67	67	64	67	64	67
PB STA 2OIL	134	134	128	134	128	134
SALEM1 #2OIL	3	3	3	3	3	3
SALEM2 #2OIL	3	3	3	3	3	3
SAL STA 2OIL	6	6	6	6	6	6
LIM1 AUX BLR	1,300	1,300	1,300	1,300	1,300	1,300
LIM2 AUX BLR	0	0	0	0	0	0
LIM STA AUX	1,300	1,300	1,300	1,300	1,300	1,300
LIM1 DIESEL	210	210	161	210	161	210
LIM2 DIESEL	0	0	0	0	0	0
LIM STA DSL	210	210	161	210	161	210
LIM STA 2OIL	1,510	1,510	1,461	1,510	1,461	1,510
TOTAL FOR ALL NUCLEAR UNITS (PE SHARE)						
NUCL #2OIL	1,650	1,650	1,595	1,650	1,595	1,650
PEACH BOTTOM DIESEL (PS, AE, &DPL SHARES)						
PB2DSL NONPE	91	91	86	91	86	91
PB3DSL NONPE	91	91	86	91	86	91
PB DSL NONPE	182	182	172	182	172	182
LIMERPC AUX	0	0	0	0	0	0
LIMERPC DSL	0	0	0	0	0	0
LIMER PRECON	0	0	0	0	0	0

FUEL BURN (2 OIL BBLS.)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
DIESEL FOR NUCLEAR UNITS							
PEACH BOTTOM (PE SHARE ONLY)							
PB2 #2OIL	67	60	67	64	67	64	785
PB3 #2OIL	67	60	67	64	67	64	785
PB STA 2OIL	134	120	134	128	134	128	1,570
SALEM1 #2OIL	3	3	3	3	3	3	36
SALEM2 #2OIL	3	3	3	3	3	3	36
SAL STA 2OIL	6	6	6	6	6	6	72
LIM1 AUX BLR	1,300	1,200	1,300	1,300	1,300	1,300	15,500
LIM2 AUX BLR	0	0	0	0	0	0	0
LIM STA AUX	1,300	1,200	1,300	1,300	1,300	1,300	15,500
LIM1 DIESEL	210	164	210	161	161	161	2,278
LIM2 DIESEL	0	0	0	0	0	0	0
LIM STA DSL	210	166	210	161	210	161	2,278
LIM STA 2OIL	1,510	1,364	1,510	1,461	1,510	1,461	17,778
TOTAL FOR ALL NUCLEAR UNITS (PE SHARE)							
NUCL #2OIL	1,650	1,490	1,650	1,595	1,650	1,595	19,420
PEACH BOTTOM DIESEL (PS, AE, &DPL SHARES)							
PB2DSL NONPE	91	82	91	86	91	86	1,063
PB3DSL NONPE	91	82	91	86	91	86	1,063
PB DSL NONPE	182	164	182	172	182	172	2,126
LIMERPC AUX	0	0	0	0	0	0	0
LIMERPC DSL	0	0	0	0	0	0	0
LIMER PRECOM	0	0	0	0	0	0	0

FUEL BURN (2 OIL BBLS.)

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
INTERNAL COMBUSTION						
RICH GE CT	10,800	15,900	5,600	2,700	5,600	600
RICH NE CT	0	0	0	0	0	0
RICH NO CT	0	0	0	0	0	0
RICHCT TOTAL	10,800	15,900	5,600	2,700	5,600	600
SOUTHWARK CT	520	1,780	920	0	0	0
EDDYSTONE CT	760	2,030	850	0	0	0
DELAWARE CT	670	1,820	870	0	0	0
SCHUYLKILLCT	260	1,070	230	0	0	0
CHESTER CT	520	1,160	690	0	0	0
FALLS CT	600	1,600	680	0	0	0
MOSER CT	600	1,860	770	0	0	0
PLY MTG CT	0	0	0	0	0	0
PE SUBTOTAL	14,730	27,220	10,610	2,700	5,600	600
CROYDON	28,000	42,000	21,000	14,000	13,000	7,000
PE CT TOTAL	42,730	69,220	31,610	16,700	18,600	7,600
PE DIESELS	90	40	40	40	250	70
PE TOTAL	42,820	69,260	31,650	16,740	18,850	7,670
MINEMOUTH D	20	50	40	0	0	0
SALEM3	87	43	87	0	0	0
TOTAL IC	42,927	69,353	31,777	16,740	18,850	7,670
STEAM HEAT	8	6	4	4	13	21
TOTAL BARRELS TO BE PURCHASED (EXCLUDES MINEMOUTH & SALEM)						
NO 2 OIL	49,394	75,132	38,165	23,160	24,324	15,087
TOTAL NO 2 OIL FOR PE ELECTRIC SYSTEM (EXCLUDES STEAM HEAT & PB2&3(NONPE))						
TOTAL NO 2	49,817	75,743	38,922	23,380	24,845	16,990

FUEL BURN   (2 OIL BBLS.)

INTERNAL COMBUSTION	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
RICH GE CT	2,700	2,100	300	7,000	1,700	3,000	58,000
RICH ME CT	0	0	0	0	0	0	
RICH MO CT	0	0	0	0	0	0	
RICHCT TOTAL	2,700	2,100	300	7,000	1,700	3,000	58,000
SOUTHWARK CT	0	0	0	310	0	0	3,530
EDDYSTONE CT	0	0	0	310	0	0	3,950
DELAWARE CT	0	0	0	640	0	0	1,640
SCHUYLKILLCT	0	0	0	80	0	0	4,000
CHESTER CT	0	0	0	470	0	0	2,840
FALLS CT	0	0	0	350	0	0	3,230
MOSER CT	0	0	0	520	0	0	3,750
PLY MTG CT	0	0	0	0	0	0	0
PE SUBTOTAL	2,700	2,100	300	9,680	1,700	3,000	80,940
CROYDON	19,000	22,000	5,000	17,000	6,000	11,000	205,000
PE CT TOTAL	21,700	24,100	5,300	26,680	7,700	14,000	285,940
PE DIESELS	380	190	20	100	0	0	1,220
PE TOTAL	22,080	24,290	5,320	26,780	7,700	14,000	287,160
SALEM#3	0	0	0	30	0	0	160
MINEMOUTH D	0	0	0	0	0	0	217
TOTAL IC	22,080	24,290	5,320	26,810	7,700	14,000	287,517
STEAM HEAT	20	21	27	14	6	3	147

TOTAL NO 2 OIL FOR PE ELECTRIC SYSTEM (EXCLUDES STEAM HEAT & PB2&3(NONPE))

NO 2 OIL

TOTAL BARRELS TO BE PURCHASED (EXCLUDES MINEMOUTH & SALEM)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
NO 2 OIL	30,136	30,519	11,163	31,715	12,962	20,844	362,601
TOTAL NO 2 OIL	31,160	31,160	11,160	31,765	13,080	21,275	369,257
TOTAL NO 2	31,160	31,160	11,160	31,765	21,275		369,257

TONS OF COAL	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
PHILA AREA COAL						
ED1 COAL	39,000	43,000	42,000	47,000	44,000	39,000
ED2 COAL	43,000	51,000	11,000	0	0	15,000
ED STA COAL	82,000	94,000	53,000	47,000	44,000	54,000
CR1 COAL	21,000	23,000	23,000	28,000	25,000	28,000
PE COAL	103,000	117,000	76,000	75,000	69,000	82,000
MINEMOUTH COAL						
CON1 COAL	32,000	38,000	34,000	34,000	31,000	34,000
CON2 COAL	35,000	36,000	38,000	37,000	31,000	29,000
CON STA COAL	67,000	72,000	72,000	71,000	62,000	63,000
KEYST1 COAL	43,000	43,000	38,000	44,000	38,000	36,000
KEYST2 COAL	5,000	34,000	35,000	38,000	34,000	36,000
KEY STA COAL	48,000	77,000	73,000	82,000	72,000	72,000
MINEMTH COAL	115,000	149,000	145,000	153,000	134,000	135,000
TOTAL COAL	218,000	266,000	221,000	228,000	203,000	217,000

MCF OF GAS (EDDYSTONE SCRUBBER RELATED)						
ED1 SCRUBGAS	65,000	71,000	69,000	78,000	26,000	0
ED2 SCRUBGAS	70,000	84,000	18,000	0	0	0
TOTAL GAS	135,000	155,000	87,000	78,000	26,000	0

= MAR 3 1986

FUEL BURN (TONS & MCF)	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
TONS OF COAL							
PHILA AREA COAL							
ED1 COAL	44,000	40,000	39,000	42,000	39,000	36,000	494,000
ED2 COAL	53,000	35,000	48,000	46,000	47,000	36,000	385,000
ED STA COAL	97,000	75,000	87,000	88,000	86,000	72,000	879,000
CRI COAL	33,000	26,000	21,000	11,000	20,000	20,000	268,000
PE COAL	130,000	101,000	108,000	99,000	95,000	92,000	1,147,000
MINEMOUTH COAL							
CON1 COAL	38,000	33,000	37,000	34,000	40,000	34,000	419,000
CON2 COAL	36,000	25,000	2,000	33,000	40,000	30,000	370,000
CON STA COAL	76,000	58,000	39,000	67,000	80,000	64,000	789,000
KEYST1 COAL	37,000	36,000	45,000	8,000	27,000	41,000	436,000
KEYST2 COAL	33,000	33,000	38,000	37,000	43,000	37,000	403,000
KEY STA COAL	70,000	69,000	83,000	45,000	70,000	78,000	839,000
MINEMTH COAL	144,000	127,000	122,000	112,000	150,000	142,000	1,628,000
TOTAL COAL	274,000	228,000	230,000	211,000	245,000	234,000	2,775,000
MCF OF GAS (EDDYSTONE SCRUBBER RELATED)							
ED1 SCRUBGAS	0	0	4,000	70,000	64,000	60,000	507,000
ED2 SCRUBGAS	0	0	6,000	76,000	77,000	58,000	389,000
TOTAL GAS	0	0	10,000	146,000	141,000	118,000	896,000

	TOTAL SYSTEM SALES KWH 1000 (X) 2=3/1X	CURRENT ENERGY COST MILLS/KWH (A) 3	ACTUAL TOTAL ENERGY COST (A) 4	ACTUAL ENERGY COST ALLOC. FACTOR (B)	ACTUAL ENERGY COST PECO RETAIL CUSTOMER 5=3X4	ACTUAL ENERGY COST RETAIL CUSTOMER SALES KWH (C) 6	ACTUAL ENERGY COST RECOVERED IN BASE RATES BASE MILLS/KWH 7=6XBASE	ACTUAL ENERGY COST OVER BASE 8=5-7	ENERGY COST (F/ST)-B -3.627 MILLS/KWH 9	FUEL REVENUE EXCL. GRT 10=9X6	HT TIME OF USE SALEN 2 CREDIT EXCL. GRT 11	TOTAL REVENUE 12=11+10	TOTAL REVENUE INCLUDING SALEN 2 REVENUE CREDIT EXCL. GRT 13
FEB'85	2520135788.	28.754	72464096.	0.9741	70587276.	2459350733.	9299585.	1287691.	-3.868705	-9515156.	-414940.	-9930096.	-6468921.
MAR'85	2274670800.	24.779	56365062.	0.9755	54984218.	2216448759.	62655093.	-7470975.	-4.865725	-10784629.	-770448.	-11555077.	-8039259.
APR'85	2180772632.	22.277	48561504.	0.9758	47405832.	2127576959.	59950864.	-12545032.	-5.447320	-11590102.	-300059.	-11890161.	-7716911.
MAY'85	2133269785.	19.773	42180903.	0.9770	41210742.	2080384413.	58621072.	-17410330.	-5.790760	-12063547.	-222280.	-12285827.	-7545742.
JUN'85	2176308704.	20.080	43699744.	0.9775	42716500.	2124535844.	59865171.	-17146671.	-5.811175	-12346047.	505451.	-11840596.	-7705883.
JUL'85	2406564458.	28.947	69663946.	0.9812	68354264.	2355394746.	66370313.	1983951.	-5.811175	-13687609.	499633.	-13187976.	-8543299.
AUG'85	2527057557.	25.602	64698734.	0.9807	63450048.	2474913183.	69738104.	-6288056.	-5.811175	-14382152.	589708.	-13792444.	-8976733.
SEP'85	2494818450.	20.879	52090306.	0.9735	50709913.	2429767806.	68465997.	-17756084.	-5.811175	-14119805.	507674.	-13612131.	-8812987.
OCT'85	2279767534.	23.167	52815081.	0.9816	51643283.	2237250322.	63041240.	-11197957.	-5.811175	-13001051.	-280078.	-13281129.	-8114708.
NOV'85	2121277797.	16.992	31801244.	0.9791	31136598.	2073592014.	58429676.	-27293078.	-5.811175	-12050004.	-310982.	-12360986.	-7521105.
DEC'85	2647071634.	25.551	67635562.	0.9777	66127289.	2583962890.	67175306.	-11048017.	-5.811175	-13853621.	-386213.	-14239834.	-8646648.
JAN'86	2652645320.	25.758	68476206.	0.9772	66916948.	2596367462.	73160442.	-6245494.	-5.811175	-15087945.	-387747.	-15475692.	-9417259.
YEARLY TOTAL TO DATE	29420166259.		670072388.		655440811.	27559545131.	776572863.	-121132052.		-152481668.	-970281.	-153451949.	-97509586.

BASE = 26.175 MILLS/KWH

* FEB'85 SALES PRIOR TO 1/25/85 = 675869126 KWH
* FEB'85 SALES AFTER 1/25/85 = 1783501607 KWH

(A) TOTAL ENERGY COST = FUEL COST + NET INTERCHANGE - HT SUPPLEMENTAL ENERGY.

(B) SEE SHEET 3 OF 3 FOR DEVELOPMENT OF THE ALLOCATION FACTOR.

(C) DOES NOT INCLUDE HT SUPPLEMENTAL ENERGY

(D) PER COMMISSION ORDER ENTERED MAY 21, 1982 AT RATE CASE NO. R-811626, PAGE 60.

MAR 3 1986

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS
ENERGY COST RATE RECONCILIATION
REPORT ENDED JAN'86

	SALEM 2 ALLOCATED JURISDICTION SAVINGS	SALEM 2 JURISDICTION SAVINGS SHORTFALL	CURRENT PERIOD O/U RECOVERY	INT. RATE	INT. FACTOR	INTEREST
	14	15=13x14	16=12-0-15	17	18	19=16x17x18/100
FEB'85	0.	-6668921.	-4748066.	13.75	20./12	-1068282.
MAR'85	0.	-6039250.	3955157.	13.75	19./12	861071.
APR'85	1605476.	-6231437.	6866308.	13.75	18./12	1420301.
MAY'85	759025.	-25917.	5150420.	14.25	17./12	1039741.
JUN'85	9970593.	2269110.	3042965.	14.00	16./12	568020.
JUL'85	7630189.	-913060.	-14258887.	13.50	15./12	-2406187.
AUG'85	8339990.	-636743.	-6867645.	12.75	14./12	-1021562.
SEP'85	8990350.	177363.	3966590.	13.00	13./12	556628.
OCT'85	10793991.	2679203.	-4762455.	13.00	12./12	-619119.
NOV'85	9828703.	2307678.	-12624414.	13.25	11./12	1533340.
DEC'85	4043490.	-4603558.	-8588459.	13.00	10./12	-930416.
JAN'86	5961645.	-3478613.	-5754585.	12.50	9./12	-539492.
YEARLY TOTAL TO DATE	74544732.	-22964854.	-9355043.			-623957.

MAR 3 1986

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS
ALLOCATION FACTOR
BASED ON GENERATION

	SYSTEM GENERATION	BLX TO PE	PE TO CP SALES	SALES TO LANSDALE	INTERDPT. SALES	SE TO CP SALES	SALES APPLICABLE TO LOSS FACTOR	CALCULATED GENERATION	NUMERATOR	ALLOCATION FACTOR
	40	41	42	43	44	45	46=42+43+44+45	47=46/(1-.0358)	48=40+41+47	49=48/49
FEB'85	2432300000.	0.	37140942.	9230000.	6035348.	8375765.	60782055.	236925577.	2369225578.	0.9741
MAR'85	2459907000.	3359.	36046000.	8940000.	6205938.	8205938.	60360164.	239952195.	2399522195.	0.9755
APR'85	2201412000.	2061.	31549937.	9280000.	5225833.	7139903.	55174793.	226239260.	2262239260.	0.9758
MAY'85	2364000000.	704.	32159000.	9000000.	4863766.	6862608.	54052947.	238915079.	2389150797.	0.9770
JUN'85	2384685000.	0.	31190000.	9000000.	5504387.	6698513.	54399045.	233905958.	2339095958.	0.9775
JUL'85	2821949000.	1333.	37390000.	8300000.	5328546.	7651166.	52075457.	276086870.	2760868670.	0.9612
AUG'85	2808889000.	866.	39339870.	800000.	5490888.	7513616.	54064381.	278805643.	2788054643.	0.9607
SEP'85	2543991000.	1109.	52409559.	0.	5481741.	7159544.	67470822.	247652257.	2476521257.	0.9735
OCT'85	2393163000.	886.	30040864.	0.	5176011.	7500337.	46099045.	234904461.	2349044461.	0.9816
NOV'85	2368102000.	812.	34973000.	0.	5019995.	7692788.	45959910.	231864290.	2318642902.	0.9791
DEC'85	2732546000.	1230.	43790000.	0.	5307226.	9680079.	60964087.	267158314.	2671583143.	0.9777
JAN'86	2827562000.	5293.	46420000.	0.	5054092.	9812766.	64396770.	276517052.	2765170523.	0.9772

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS
ENERGY COST RATE RECONCILIATION
ESTIMATED REPORT ENDED APR '86

	TOTAL SYSTEM SALES KWH	CURRENT ENERGY COST MILLS/KWH	ACTUAL TOTAL ENERGY COST $ (A)	ACTUAL ENERGY COST ALLOC. FACTOR (B)	ACTUAL ENERGY COST PECO RETAIL CUSTOMER $	RETAIL CUSTOMER SALES KWH (C)	ACTUAL ENERGY COST RECOVERED IN BASE RATES $	ENERGY COST OVER BASE $	FUEL (F/ST)-B MILLS/KWH = 3.627	REVENUE EXCL. GRT ADJ. $	HT TIME OF USE REVENUE EXCL. GRT (D) $	TOTAL REVENUE EXCL. GRT $	SALEM-2 CREDIT EXCL. GRT $
	1 1000	2=3/1X	3 (A)	4 (B)	5=3X4	6 (C)	7=6XBASE	8=5-7	9	10=9X6	11 (D)	12=11+10	13
FEB'86	2450721000.	21.298	52194482.	0.9785	51072301.	2399121000.	67602432.	-16530131.	-5.811175	-13941711.	0.	-13941711.	-6701626.
MAR'86	2521221000.	26.841	62304267.	0.9787	60977186.	2268621000.	63925203.	-2948017.	-5.811175	-13183352.	0.	-13183352.	-6286093.
APR'86	2231718000.	19.626	43798715.	0.9788	42870182.	2185418000.	61580708.	-18710526.	-5.233400	-11437031.	0.	-11437031.	-467676.

YEARLY TOTAL TO-DATE	7003660000.		158297464.		154919669.	6853160000.	193108343.	-38188674.		-38562094.	0.	-38562094.	-17397997.

BASE = 28.178 MILLS/KWH

(A) TOTAL ENERGY COST = FUEL COST + NET INTERCHANGE - HT SUPPLEMENTAL ENERGY

(B) SEE SHEET 6 OF 8 FOR DEVELOPMENT

(C) DOES NOT INCLUDE HT SUPPLEMENTAL ENERGY (SEE SHEET 6 OF 8)

(D) PER COMMISSION ORDER ENTERED MAY 21, 1982, AT RATE CASE NO. R-811626, PAGE 60.(SEE SHEET 7 OF 8)

	SALEM 2 ALLOCATED SAVINGS 14	SALEM 2 SAVINGS SHORTFALL 15=13+14	CURRENT PERIOD O/U RECOVERY 16=12-8-15	INT. RATE 17	INT. FACTOR 18	INTEREST 19=16X17X18/100
FEB'86	8610799.	-91029.	2679449.	12.00	20./12	535890.
MAR'86	10276349.	-2047056.	-12283191.	12.00	19./12	-2333806.
APR'86	0.	-467676.	7741171.	12.00	18./12	1393411.
YEARLY TOTAL TO DATE	18887148.	1489151.	-1862571.			-404505.

MAR 3 1986

MAR 3 1986

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS
ALLOCATION FACTOR
BASED ON GENERATION
ESTIMATED REPORT ENDED APR'86

	SYSTEM GENERATION 40	BLI TO PE 41	PE TO CP SALES 42	SALES TO LANSDALE 43	INTERDPT SALES 44	SE TO CP SALES 45	SALES APPLICABLE TO LOSS FACTOR 46=42+43+44+45	CALCULATED GENERATION 47=46/(1-.03587)	NUMERATOR 48=40+41-47	ALLOCATION FACTOR 49=48/40
FEB'86	2484620000.	7000.	37600000.	0.	5700000.	8300000.	51600000.	53519754.	2430907246.	0.9785
MAR'86	2556712000.	7000.	36400000.	0.	5700000.	8500000.	52600000.	54556958.	2502162042.	0.9787
APR'86	2268698000.	0.	34000000.	0.	5100000.	6400000.	46300000.	48022570.	2218875430.	0.9788

Philadelphia Electric Company
Reconciliation of Correction Factor
February 1986 Through April 1986
Estimated

Beginning Balance 1-31-86 (Alternate 1)   ($66,706,536)

Amount Recovered by "E" Factor:

	kWH Sales to Pa. Jurisdictional Customers	"E" Factor Mills/kWh (Excl. GRT)	
Feb '86 & Mar '86	4,667,742,000	6.069025	28,328,643
April 1986	2,185,418,000	2.411862	5,270,927

Undercollection at 4-30-86   (1,862,571)
Applicable Interest due customer   0

Ending Balance 4-30-86 (To be
  recouped via "E" factor
  effective 6-27-86)   ($34,969,537)

March 3, 1986

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS
ENERGY COST RATE RECONCILIATION
ESTIMATED REPORT ENDED JUN 87

	TOTAL SYSTEM SALES KWH (1)	CURRENT ENERGY COST MILLS/KWH (2=3/1X 1000)	ACTUAL TOTAL ENERGY COST $ (3) (A)	ACTUAL ENERGY COST ALLOC. FACTOR PECO RETAIL CUSTOMER (4) (B)	ACTUAL ENERGY COST PECO RETAIL CUSTOMER (5=3X4)	ACTUAL ENERGY COST RETAIL CUSTOMER SALES KWH (6) (C)	ACTUAL RETAIL CUSTOMER ENERGY COST RECOVERED IN BASE RATES $ (7=6XBASE)	(F/ST)-B -3.627 MILLS/KWH (8=5-7)	(9)	FUEL REVENUE EXCL. GRT $ (10=9X6) (11)	HT TIME OF USE ADJ. $ (D)	TOTAL REVENUE EXCL. GRT (12=11+10)	SALES & CREDIT (13)
JUL 86	2593921000.	15.868	40893193.	0.9804	39503446.	2485121000.	51747675.	-12244229.	-4.624837	-11493280.	0.	-11493280.	0.
AUG 86	2577716000.	15.162	39083057.	0.9805	38321722.	2525916000.	52576326.	-14254605.	-4.624837	-11677325.	0.	-11677325.	0.
SEP 86	2481319000.	15.468	38380214.	0.9812	37658666.	2436719000.	50739800.	-13081134.	-4.624837	-11269428.	0.	-11269428.	0.
OCT 86	2216317000.	15.994	35468252.	0.9780	34668391.	2166517000.	45113383.	-10444992.	-4.624837	-10019788.	0.	-10019788.	0.
NOV 86	2145920000.	16.434	35226581.	0.9601	34525572.	2097720000.	43360824.	-9155252.	-4.624837	-9701613.	0.	-9701613.	0.
DEC 86	2402124000.	16.810	40380746.	0.9760	39411608.	2342624000.	48759637.	-9348026.	-4.624837	-10829629.	0.	-10829629.	0.
JAN 87	2481080000.	12.810	32200377.	0.9764	32416949.	2589691000.	52675756.	-20258907.	-4.624837	-11699409.	0.	-11699409.	0.
FEB 87	2461804000.	15.230	37492407.	0.9779	36663825.	2409857000.	50180452.	-13516627.	-4.624837	-11145196.	0.	-11145196.	0.
MAR 87	2331728000.	14.180	35063871.	0.9781	32339773.	2270877000.	47450911.	-15111136.	-4.624837	-10538958.	0.	-10538958.	0.
APR 87	2241017000.	16.778	37612801.	0.9787	36811649.	2195196000.	45710566.	-6898917.	-4.624837	-10152424.	0.	-10152424.	0.
MAY 87	2069635000.	18.261	37792869.	0.9800	37037012.	2024831000.	42165056.	-5126044.	-4.624837	-9364513.	0.	-9364513.	0.
JUN 87	2241210000.	22.490	50405603.	0.9813	49463019.	2195294000.	45712607.	-6624837.	-4.624837	-10152877.	0.	-10152877.	0.
YEARLY TOTAL			458150771.		448821532.	276862600000.	576510693.	-127689962.		-128044460.	0.	-128044460.	0.
TO DATE													

BASE = 20.623 MILLS/KWH

(A) TOTAL ENERGY COST = FUEL COST + NET INTERCHANGE - HT SUPPLEMENTAL ENERGY

(B) SEE SHEET 3 OF 3 FOR DEVELOPMENT

(C) DOES NOT INCLUDE HT SUPPLEMENTAL ENERGY

(D) PER COMMISSION ORDER ENTERED MAY 21, 1982 AT RATE CASE NO. R-811626, PAGE 60.

MAR 3 1986

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS
ENERGY COST RATE RECONCILIATION
ESTIMATED REPORT ENDED JUN'87

	SALEM 2 ALLOCATED SAVINGS 14	SALEM 2 SAVINGS SHORTFALL 15=13+14	CURRENT PERIOD O/U RECOVERY 16=12-8-15	INT. RATE 17	INT. FACTOR 18	INTEREST 19=16X17X18/100
JUL'86	0.	0.	750949.	12.00	20./12	150190.
AUG'86	0.	0.	2577280.	12.00	19./12	489686.
SEP'86	0.	0.	1811706.	12.00	18./12	326105.
OCT'86	0.	0.	425204.	12.00	17./12	72286.
NOV'86	0.	0.	-546361.	12.00	16./12	-87419.
DEC'86	0.	0.	-1981600.	12.00	15./12	-222240.
JAN'87	0.	0.	8559498.	12.00	14./12	1198330.
FEB'87	0.	0.	2371431.	12.00	13./12	308287.
MAR'87	0.	0.	4572180.	12.00	12./12	548662.
APR'87	0.	0.	-1253507.	12.00	11./12	-137886.
MAY'87	0.	0.	-4238469.	12.00	10./12	-423048.
JUN'87	0.	0.	-13903289.	12.00	9./12	-1251297.
YEARLY TOTAL TO DATE	0.	0.	-354978.			970857.

MAR 3 1986

MAR 3 1986

PHILADELPHIA ELECTRIC COMPANY-ELECTRIC OPERATIONS
ALLOCATION FACTOR
BASED ON GENERATION
ESTIMATED REPORT ENDED JUN'87

	SYSTEM GENERATION 40	BLI TO PE 41	PE TO CP SALES 42	SALES TO LANSDALE 43	INTERDPT SALES 44	SE TO CP SALES 45	SALES APPLICABLE TO LOSS FACTOR 46=42+43+44+45	CALCULATED GENERATION 47=46/(11-.03587)	NUMERATOR 48=40+41-47	ALLOCATION FACTOR 49=48/40
JUL'86	2662594000.	0.	41100000.	0.	5200000.	7900000.	54200000.	56216815.	2806377515.	0.9804
AUG'86	2800103000.	0.	40400000.	0.	5200000.	7200000.	52800000.	54764399.	2747238841.	0.9808
SEP'86	2465498000.	0.	33500000.	0.	5200000.	5900000.	44600000.	46259322.	2419238678.	0.9812
OCT'86	2347598000.	0.	37400000.	0.	5100000.	7300000.	49800000.	51652785.	2295745215.	0.9788
NOV'86	2385547000.	0.	33600000.	0.	4500000.	7500000.	45800000.	47503967.	2338043033.	0.9801
DEC'86	2619040000.	0.	45800000.	0.	5600000.	9100000.	60500000.	62750074.	2556689126.	0.9761
JAN'87	2729656000.	0.	45617000.	0.	6700000.	9800000.	62117000.	64428034.	2665515946.	0.9764
FEB'87	2437607000.	0.	37947000.	0.	5700000.	8300000.	51947000.	53879664.	2383727338.	0.9779
MAR'87	2504056000.	0.	38754000.	0.	5700000.	8500000.	52954000.	54924128.	2449931872.	0.9781
APR'87	2669953000.	0.	35121000.	0.	5100000.	6600000.	46621000.	48355512.	2616597456.	0.9787
MAY'87	2326463000.	0.	33304000.	0.	5100000.	6400000.	44804000.	46470912.	2279816708.	0.9800
JUN'87	2553366000.	0.	34516000.	0.	4900000.	6500000.	45916000.	47624283.	2505741717.	0.9813

Philadelphia Electric Company
STATEMENT OF REASONS

I. The projected ECRF of (3.520) m/kWh is a decrease of 0.604 m/kWh in comparison to the current ECR of (2.916) m/kWh. The reasons for this decrease are as follows:

1. A reduction in the cost of energy of 7.355 m/kWh as a result of the fuel savings anticipated when Limerick Unit #1 begins commercial opertion.

2. An undercollection of $34,969,537 applicable to the current ECRF which will be recovered by the correction factor of the proposed rate. This undercollection resulted in a 47.6% decrease to the "E" factor.

March 3, 1986

Residential Bill Analysis

The monthly cost of energy to the average Residential customer (500 kWh) will decrease 0.5% or $0.30 from $58.15 to $57.85.

March 3, 1986

PENNSYLVANIA PUBLIC UTILITY COMMISSION RECEIVED

v.

MAR 1 4 1986

PHILADELPHIA ELECTRIC COMPANY SECRETARY'S OFFICE
Public Utility Commission

DOCKET NO. R-850152

ADDITIONAL SUR-SURREBUTTAL TESTIMONY

OF

THOMAS P. HILL, JR.

RE: LIMERICK RELATED ISSUES FROM GOVERNOR'S ENERGY COUNCIL,

UTILITY USERS COMMITTEE, AND PHILADELPHIA AREA

INDUSTRIAL ENERGY USERS GROUP

DOCKETED

MAR 18 1986

DOCUMENT FOLDER

MARCH 1986

ADDITIONAL SUR-SURREBUTTAL TESTIMONY OF THOMAS P. HILL, JR.

Q. Are you the same Mr. Hill who has previously filed direct, rebuttal and sur-surrebuttal testimony in this proceeding?

A. Yes. I have previously submitted direct testimony identified as PECO Statements No. 18, 18A and 18B, I have submitted rebuttal testimony identified as PECO Statements No. 18C, 18D, 18E and 18F, and I have submitted sur-surrebuttal testimony identified as PECO Statement No. 18G.

Q. What is the purpose of this sur-surrebuttal testimony?

A. My sur-surrebuttal testimony will respond to the issues of phase-in, performance standards and discount rates discussed in the surrebuttal testimony of Governor's Energy Council Witness Wilson, Utility Users Committee Witness Chernick and Philadelphia Area Industrial Energy Users Group Witness Falkenberg.

Q. Mr. Hill, would you please comment on Witness Wilson's incentive program, summarizing the Company's principal objections?

A. Yes. The Company has previously responded in detail to Witness Wilson's proposal for nuclear performance standards and the integration of such a proposal with an 80%/20% ECR. This response will not be repeated here.

The Company's objections to Witness Wilson's proposals, his 65% minimum performance standard and his reward/penalty provision, are based on equity and fairness. The Company believes that, if an incentive plan is adopted, it should be an equitable one which provides for a fair and equal opportunity for gain or loss. Witness Wilson's proposal clearly does not meet this test. Indeed, Witness Wilson's plan assures that no matter how PECO's nuclear units perform and irrespective of prudent action, the Company will suffer a loss under almost any conceivable set of realistic circumstances. Witness Wilson's proposal is not an incentive program, but

a rather thinly disguised attempt to penalize the Company and prevent it from recovering its reasonable and prudent energy costs, contrary to sound regulatory principles.

First, Witness Wilson's proposal is inequitable because it fails to reflect the expected performance of PECO's nuclear units over the next three years. Specifically, if the Company's nuclear units perform as expected over the next three years (i.e., 61.1% in 1987, 58.4% in 1988, and 65.9% in 1989 - projections which have not been challenged by any party as unreasonable or inaccurate), the Company will suffer a loss in 1987 and 1988.

Second, even when the Company's nuclear units perform at an average of 65% over a given period (rising above 70% in some years and falling below 60% in others), the Company would be penalized under Witness Wilson's plan. This is because, as Mr. Carroll demonstrates in his rebuttal testimony, the cost incurred to generate a MWH to replace nuclear generation below a 65% capacity factor is greater than the savings resulting from nuclear generation over a 65% level.

Third, this penalty inherent in Witness Wilson's proposal is exacerbated by the unbalanced nature of the reward/penalty provision by which the Company is at risk for 100% of potential losses for operation below 60% but can recover only 50% of the potential gains for operation above 70%.

Finally, when Witness Wilson's proposal is considered in conjunction with the 80%/20% ECR mechanism, its unfairness is compounded. As I have stated in Statement 18G, Dr. Wilson's proposal is clearly redundant. Dr. Wilson suggests that his "nuclear incentive proposal focuses on a specific performance problem area". There is no question that his proposal seeks to address nuclear performance. However, there is also no question that the Company's baseload nuclear units are

included in total fuel and interchange expense and subject to the 80%/20% ECR mechanism. Since nuclear performance is included in both proposals, Wilson's proposal must certainly be duplicative. Moreover, as explained in my prior rebuttal testimony on this issue, the combination of the 80%/20% ECR with Witness Wilson's proposal would impose an additional penalty on the Company even if it precisely projected its total fuel costs and its nuclear capacity factor fell within a 60%-65% range.

Philadelphia Electric does not seek the benefits or "carrots" that Dr. Wilson alludes to, but rather only seeks the opportunity to provide good service to our customers with a fair opportunity to recover our costs that are prudently incurred. If a system such as Dr. Wilson's proposal is even to be considered, it must be so balanced as to provide a fair opportunity to "break even". Dr. Wilson's proposal does not even purport to meet this test of fairness.

Q. What comments do you have on Mr. Chernick's discussion of discount rates contained in his surrebuttal testimony?

A. I am delighted to see that Mr. Chernick accepts the fact that tax effects must be considered in the establishing of an appropriate discount rate. However, the Company does not ignore the tax consequences associated with equity capitalization. The Company's discount rate of 9.7% represents the after-tax cost of capital after recognizing the tax deductibility of the debt component as well as the taxability of the equity component.

Moreover, contrary to Mr. Chernick, the discount rate, as formulated by PECO, is not only correct in non-regulated industries but is appropriate in the regulated sector, i.e. $2.00 worth of revenue is required to pay $1.00 worth of earnings in either sector.

Finally, it is Mr. Chernick who is confused as to the proper discount rate to be employed when evaluating the cost of Limerick 1 versus alternatives. PECO's costs of capital and related tax rates are clearly relevant to an economic evaluation respecting customer benefits. It is the Company's cost of financing those investments and alternative investment proposals, including applicable tax effects, which the customer will pay. Thus, in evaluating the impact of alternative courses of action involving different capital investment programs upon the ratepayer, utility capital cost rates and related tax effects are the proper discount rate.

Q. Would you discuss Mr. Falkenberg's comments concerning his six-year average revenue requirement for Limerick?

A. Yes. Mr. Falkenberg has obviously failed to understand my comments concerning this proposal. I do not argue that the revenue requirements associated with the initial placement of capital in-service for Limerick 1 will not decline over time. In fact, the simple logic of depreciation tells us that capital will be recovered over the useful life of the asset, and therefore, it is safe to assume that revenue requirements for the initial placement of capital will decline over the first six years. Further, I make no argument that capital additions and the effect of deferred taxes for Limerick will offset the effects of depreciation. My testimony seeks only to instruct Mr. Falkenberg on the real world as it pertains to the books and records of Philadelphia Electric Company. Operating expenses and plant are not stagnant. Limerick represents but a portion of our rate base and one element of many making up our total revenue requirement, and as such, cannot be looked at in isolation over a period of six years to determine appropriate rate levels for this Company. To do so as proposed by Mr. Falkenberg is inappropriate and therefore, the adjustment proposed by Mr. Falkenberg should be rejected.

1	Q. Please discuss Mr. Falkenberg's comments on discount rate.
2	
3	A. Mr. Falkenberg continues to misinterpret an EEI survey to support his higher
4	
5	discount rate selection. Mr. Falkenberg's naive conclusion that the "cost of capital
6	
7	used for internal economic evaluation" is equivalent to a discount rate is absurd.
8	
9	While the survey speaks for itself, it is evident that Mr. Falkenberg cannot draw
10	
11	this conclusion since, as I have indicated, the questionnaire asks only for utilities to
12	
13	report whether they utilize incremental or embedded costs in economic
14	
15	evaluations. No credible testimony can be presented from the results of this survey
16	
17	other than answering the question of whether the majority practice is to use
18	
19	embedded or incremental costs. The survey quite clearly did not inquire whether a
20	
21	before or after discount tax rate should be used. It clearly does not mention or
22	
23	imply that the cost of capital number which it seeks should be the "discount rate."
24	
25	Mr. Falkenberg further errs in his use of the EEI survey data by employing
26	
27	the Company's specific response information to EEI. The data utilized to determine
28	
29	the incremental after-tax discount rate of 11.3%, which Mr. Falkenberg employs, is
30	
31	out of date and does not reflect current costs of capital to Philadelphia Electric
32	
33	Company. The survey indicates incremental costs for debt and preferred stock of
34	
35	13.0% and a return on common equity of 17.0%. Substituting current incremental
36	
37	rates of 11.75% for debt and preferred and 15.9% for equity based upon the
38	
39	testimony of Mr. Brennan yields an incremental after-tax cost of capital of 10.4%
40	
41	which is only slightly in excess of the Company's 9.7% embedded after-tax cost of
42	
43	capital used for discounting.
44	
45	Q. Mr. Falkenberg cites the technical assessment guide prepared by EPRI as support
46	
47	for a pre-tax discount rate. Does this statement affect your use of an after-tax
48	
49	discount rate?
50	

1	A. No. This EPRI report really indicates that there is no consensus within the utility
2	
3	industry as to whether the discount rate should be based upon a before or after-tax
4	
5	cost of capital. The survey also concludes that "neither method is completely
6	
7	appropriate under all circumstances for all electric utilities". For the reasons I
8	
9	have stated, Philadelphia Electric has for the past 30 years employed an after-tax
10	
11	cost of capital and will continue to do so for all future analyses.
12	
13	Q. Does that conclude your sur-surrebuttal testimony on these issues at this time?
14	
15	A. Yes.

SP̃
3-12-86
14/hg
R-850152

PENNSYLVANIA PUBLIC UTILITY COMMISSION

vs.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

ADDITIONAL SUPPLEMENTAL DIRECT TESTIMONY OF THOMAS P. HILL, JR.

Re: COMMISSION TENTATIVE AMENDED ORDER AT DOCKET C-78080459

MARCH 1986

ADDITIONAL SUPPLEMENTAL DIRECT TESTIMONY OF THOMAS P. HILL, JR.

1 Q. Are you the same Mr. Hill who has previously filed direct,

2   rebuttal and sur-surrebuttal testimony in this proceeding?

3 A. Yes. I have previously submitted direct testimonies

4   identified as PECo Statement Nos. 18, 18A and 18B. I have

5   submitted rebuttal testimony identified as PECo Statement

6   Nos. 18C, 18D, 18E and 18F and I have submitted

7   sur-surrebuttal testimony identified as PECO Statement Nos.

8   18G and 18H.

9 Q. What is the purpose of this additional supplemental direct

10   testimony?

11 A. On February 18, 1986, the Commission entered a Tentative

12   Amended Order at Docket No. C-78080459 amending a previous

13   Order of September 4, 1985. The Tentative Amended Order

14   directs that the Company file certain data and information

15   in the current rate Docket No. R-850152 as outlined in

16   Ordering Paragraphs 1 through 13 of the Tentative Order

17   within twenty days of the entry of this Order. This

18   statement responds to that Commission Order.

19 Q. Have you prepared a tabulation of the Corporate

20   Communications and other expenses per the Commission's

21   directive for the current proceeding and the two previous

22   proceedings?

23 A. Yes. The requested information contained in the

24   Commission's Tentative Amended Order (Order attached as

25   Schedule 1) is provided in tabular form as Schedule 2 to

26   this testimony.

27 Q. Would you please discuss the information contained on

1   Schedule 2?

2 A. Yes. The data requested by the Commission in response to

3   Ordering Paragraphs 1 through 13 for each of the three rate

4   proceedings has already been submitted by the Company in

5   the current rate proceeding either in response to the

6   Commission's initial Order of September 4, 1985 or through

7   Interrogatory response to the Office of Consumer Advocate.

8   Schedule 2 consolidates the information contained in PECo

9   Statement 18A, the Supplemental Direct Testimony of Thomas

10   P. Hill, Jr. and the information submitted in response to

11   Interrogatory designated IR-OCA-13-13. Relevant portions

12   of these documents are attached as Schedules 3 and 4 to

13   this testimony.

14   The dollars of expenditures for Ordering Paragraphs 1

15   through 5 represent the Company's claims, as well as the

16   Commission allowances, for these expenditures in each of

17   the three rate proceedings. Recovery of these expenses was

18   approved by the Commission in the prior two cases.

19   Ordering Paragraph 6 provides the expenditures by

20   Philadelphia Electric Company associated with the

21   contribution for TMI clean-up. As the table indicates,

22   there were no dollars included in the test year at Docket

23   No. R-822291. The Company claimed at Docket No. R-842590

24    $1 million associated with the TMI clean-up contribution.

25   This amount was specifically allowed by the Administrative

26   Law Judge and the Commission in that proceeding with the

27   Commission finding that:

1   "We agree with the ALJ and the Company that lessons

2   learned in the TMI clean-up benefit PECo in the

3   operation of its nuclear generating stations, and

4   ultimately benefit PECO's ratepayers. The OCA's

5   exception is denied." (Page 78 of the Commission's

6   Opinion and Order entered January 25, 1985 at

7   Docket No. R-842590).

8   Likewise, in the current rate proceeding at Docket No.

9 R-850152, the Company has claimed $755,830 as a further

10 contribution to the TMI clean-up. Since the Commission has

11 specifically allowed this expenditure in a prior rate

12 proceeding as being a reasonable expense recoverable from

13 ratepayers, I believe the current claim should also be

14 recoverable based on the reasoning established by the

15 Commission in the prior case. For this reason, I believe

16 the Commission's Tentative Amended Order is in conflict

17 with the Commission's last PECo electric rate order.

18   Ordering Paragraphs 7 through 9 are also

19 self-explanatory and contain the expenditures claimed and

20 allowed by this Commission in prior proceedings as well as

21 the claim in the current proceeding at Docket No. R-850152.

22   Ordering Paragraph 10 seeks to disallow those

23 expenditures for Corporate Communications, exclusive of

24 those items reflected in other Ordering Paragraphs, in

25 excess of the Company's 1978 level for Corporate

26 Communications expense. My Supplemental Direct Testimony,

27 PECo Statement No. 18A, attached as Schedule 3, provides a

1   quantification of these expenditures for the current test

2   year. As that testimony indicates, adjustment of the 1978

3   Corporate Communications expense to reflect general wage

4   increases granted by the Company and approved for inclusion

5   for ratemaking, indicates that no adjustment is appropriate

6   or required under Ordering Paragraph No. 10. I might add,

7   that the Office of Consumer Advocate through the testimony

8   of Michael Bleiweis, submitted on January 9, 1986, accepts

9   the Company's quantification for these Ordering Paragraph

10 expenditures in the prior two rate proceedings as well as

11 the current rate case proceeding.

12 Ordering Paragraph 11 seeks to quantify those

13 expenditures associated with hours spent by PECo employees

14 in lobbying which I have responded to in PECo Statement No.

15 18A. As this response indicates, lobbying activities on

16 behalf of PECo are charged below the line to lobbying

17 expense in FERC Account No. 426 and therefore the Company's

18 test year claim, as well as prior test year claims, contain

19 no lobbying expenses to be borne by the ratepayers of

20 Philadelphia Electric Company.

21 Ordering Paragraph 12 disallows all litigation costs

22 incurred by PECo at Docket No. C-78080459. As Schedule 2

23 indicates, no expense for this proceeding was claimed or

24 allowed by the Commission in the prior two rate proceedings

25 or the current rate proceeding.

26 The tabulation of Ordering Paragraphs 1 through 12

27 indicate a total claim for disallowance by the Commission

1 of $1,011,084 at Docket No. R-822291, $1,873,208 at Docket

2 No. R-842590 and $1,496,842 at Docket No. R-850152.

3 Exclusion of the TMI clean-up claims and allowances reduces

4 the totals for Docket No. R-842590 to $873,208 and for

5 Docket No. R-850152 to $741,012.

6   In response to Ordering Paragraph 13, the Company has

7 submitted this data through PECo Statement No. 18A

8 (Schedule 3 attached to this testimony).

9 Q. Mr. Hill, Ordering Paragraph 15 refers to a revenue impact

10   of expense disallowance of $4,723,000 on an annual basis

11   for current rates established at Docket No. R-842590.

12   Would you please discuss why this figure is an

13   inappropriate quantification of Ordering Paragraphs 1

14   through 12 in the Tentative Amended Order?

15 A. Yes. There are several reasons why this quantification is

16   inappropriate. First, this information represents an

17   expense quantification for Ordering Paragraphs 1 through 13

18   of Judge Kranzel's opinion at Docket C-78080459 and not the

19   quantification of Ordering Paragraphs 1 through 12 as

20   specified by the Tentative Amended Order. Paragraph 13 of

21   the Tentative Amended Order does not disallow recovery of

22   industry association payments; it merely requires the

23   Company to submit data on these payments in future rate

24   proceedings. To include these payments in an adjustment at

25   Docket No. R-842590 therefore would be in error and clearly

26   inconsistent with paragraph 13 of the Commission's Order.

27   Second, this adjustment reflects a total disallowance

1   of all Corporate Communications expenses above the actual

2   level in 1978 and does not reflect salary changes for

3   existing personnel and the actual level of personnel in

4   this department which I have explained and quantified in my

5   Supplemental Direct Testimony (PECo Statement No. 18A). As

6   I have indicated, when these adjustments for employment and

7   allowed general wage increases are reflected, there is no

8   adjustment for excess expenditures required in response to

9   Ordering Paragraph 10.

10   Third, my review of the data utilized by the Office of

11   Consumer Advocate in that prior proceeding, which was

12   supplied by the Company, contained certain errors which I

13   have corrected in response to an Interrogatory in this

14   proceeding, IR-OCA-13-13 (see Schedule 4). These errors

15   include an incorrect number for unadjusted Corporate

16   Communications expense for the 1984 budget used in the

17   development of an Interrogatory response in Docket No.

18   R-842590 and a duplication of expenses associated with

19   Speakers' Bureau Activities in the same Interrogatory

20   response.

21   The expenditures tabulated in Schedule 2 of this

22   testimony are a correct representation of the expenditures

23   allowed for ratemaking purposes at Docket No. R-842590.

24   Again, I might add, the Office of Consumer Advocate in the

25   current rate proceeding has utilized my corrected numbers

26   as the basis of a proposed adjustment in this current rate

27   proceeding.

1 Q. Mr. Hill, if it is the intent of this Commission to make an

2   adjustment to rates on a prospective basis to refund

3   dollars to customers for these expenses recovered from

4   customers for rates established at Docket No. R-822291 and

5   Docket No. R-842590, what adjustment to revenue is

6   appropriate for proper accounting purposes?

7 A. Given that I believe no retroactive adjustment to rates is

8   appropriate since the Company has not achieved the

9   Commission allowed rate of return deemed to be just and

10   reasonable during the period that these rates were in

11   effect, but accepting the calculation for accounting

12   purposes only, the proper refund of expenses for accounting

13   purposes reflecting Ordering Paragraphs 1 through 12

14   exclusive of the TMI clean-up expense is $2,416,643. Since

15   the Company expects that there will be no new base rate

16   filing prior to September 1987, based upon the testimony of

17   Mr. Paquette, and, therefore, new base rates would be in

18   effect for a two-year period, I believe a two-year

19   amortization of these expenses through the refund process

20   would be the appropriate adjustment. This would equate to

21   an annual refund of $1,208,322.

22 Q. Finally, on the same basis and assumptions that you have

23   described in your prior answer, what would be the

24   appropriate adjustment to operating expenses in the

25   Company's current rate proceeding?

26 A. On the same basis, the adjustment to operating expense

27   would be $741,012.

1 Q. Does that conclude your Additional Supplemental Direct

2   Testimony?

3 A. Yes.

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

PENNSYLVANIA
PUBLIC UTILITY COMMISSION
Harrisburg, PA 17120

Public Meeting held February 13, 1986

Commissioners Present:

Linda C. Taliaferro, Chairman, Abstaining
Frank Fischl
Bill Shane

Keystone Alliance, et al.
      v.   C-78080459
Philadelphia Electric Company

TENTATIVE AMENDED ORDER

BY THE COMMISSION:

On September 4, 1985, the Commission issued an Order in the above-proceeding which adopted, in its entirety, the Initial Decision of Administrative Law Judge (ALJ) Isador Kranzel dated August 31, 1983. All exceptions to ALJ Kranzel's Initial Decision were denied.

In view of the time elapsed (approximately two years) between the date of ALJ Kranzel's Initial Decision and the issuance of the Commission's Order, we find that it is necessary to make certain modifications to that Order for the purpose of clarifying the Commission's intent and to establish a procedure which will enable us to implement the directives contained therein.

The fundamental inconsistency of our September 4, 1985 Order is that it directed numerous unquantified adjustments to be made to the Philadelphia Electric Company (PECO or Company) expense allowance at the conclusion of the Company's rate case at Docket No. R-822291. However, that rate proceeding ended with a Commission Order entered on November 22, 1983. The PECO rates which resulted from the investigation at Docket No. R-822291 went into effect on November 23, 1983 or more than 21 months before the issuance of our Order in this complaint proceeding.

A further complication arose when PECO filed a general rate increase request on April 27, 1984. A Commission investigation of that request was held at Docket No. R-842590 and concluded with our Order adopted on January 24, 1985. No adjustment was made to the Company's expense allowance to comply with ALJ Kranzel's determinations at Docket No. C-78080459 since, as of January 24, 1985, the

Commission had not taken final action in this complaint proceeding. The Company's current base rates, which were established as a result of the investigation at Docket No. R-842590, became effective on January 25, 1985.

In summary, we find it appropriate to amend the Commission Order issued on September 4, 1985 at Docket No. C-78080459 which directed the adjustment, without quantification, of PECO base rates which became effective on November 23, 1983. Furthermore, we must take into account the Company's current base rates which have not been adjusted to accommodate the directives contained in our September 4, 1985 Order in this complaint proceeding. Finally, we must provide for the future and insure that the expenses which we have disallowed here are not incorporated in PECO's prospective rates.

We wish to make it clear that our ultimate goal is to order refunds to PECO customers of those expenses which we have disallowed here, but which have been recovered by the Company through base rates since November 23, 1983, and to make provision for the prospective disallowance of those expenses.

For the period November 23, 1983 to January 24, 1985, that interval of time when the base rates established in Docket No. R-822291 were in effect, we will direct PECO to submit to the Commission a calculation of the annual expenses disallowed here based upon the test year ended October 31, 1983, which was the future test year in Docket No. R-822291. We find that there is insufficient information on the record in this complaint proceeding to determine, with any degree of accuracy, the magnitude of an appropriate adjustment. Moreover, since we will be ordering refunds associated with rates put in effect at the close of the proceeding at Docket No. R-822291, we deem it appropriate to base the adjustment on future test year claims made in that rate proceeding. We expect the Company's data to be essentially the same in form and detail as that which it supplied in response to information requested by the Office of Consumer Advocate (OCA) in its subsequent rate proceeding at Docket No. R-842590.

The PECO base rates currently in effect were established at the conclusion of the Company's last general rate case at Docket No. R-842590 and have been in effect since January 25, 1985. In that rate proceeding, the OCA requested that PECO quantify the items in its 1984 budget which were disallowed by ALJ Kranzel in this complaint proceeding at Docket No. C-78080459. It is important to note that the year ended December 31, 1984 was the future test year in the rate case at Docket No. R-842590. The Company provided information showing that its 1984 budget

included $4,723,000 for the accounts in question (OCA Exh. 59). There is no apparent dispute regarding the accuracy of the Company's calculation. Accordingly, we find that, on an annual basis, the amount of $4,723,000 is the correct expense disallowance to be refunded to PECO customers relative to the base rates currently in effect.

On September 27, 1985 PECO filed a general rate increase request which has been suspended by the Commission and is currently under investigation at Docket No. R-850152. The suspension period ends on June 27, 1986. We noted earlier that we intend to ensure that the various expense items disallowed in this proceeding will not be recovered prospectively by the Company. To accomplish this objective we will direct PECO to submit, for the record in its current rate case at Docket No. R-850152, a quantification of the expense items which we disallowed in this proceeding based upon the future test year in the current rate proceeding.

There are approximately five months remaining to the end of the Company's current rate investigation. In consideration of this, and the fact that we are here directing PECO to submit further information to the Commission and for the record in the current rate case, we will postpone implementation of the rate impact of this complaint proceeding to coincide with our final determination in the rate investigation at Docket No. R-850152.

Except as amended by the foregoing discussion, we affirm the September 4, 1985 Order which adopted the Initial Decision of ALJ Isador Kranzel dated August 31, 1983, and we incorporate herein, the findings, conclusions, and directives contained in the Initial Decision; THEREFORE,

IT IS ORDERED:

1. That all expenditures by PECO on behalf of its Energy Education Advisory Council programs, including program materials, payments to consultants and salaries of PECO employees engaged in EEAC-related activities, shall henceforth be classified as a contribution, with such expenditures being disallowed as an expenditure to be borne by the ratepayers in the PECO rate proceeding at Docket No. R-822291.

2. That the salary, including fringe benefits, of Ms. Mollie McCormick of PECO's Law Department shall henceforth be classified entirely as lobbying and, therefore, disallowed as an expense charged to the ratepayers in the PECO rate proceeding at Docket No. R-822291.

3. That all payments to Reverend Cecil D. Gallup, a consultant to the Corporate Communications Department, shall be classified entirely as lobbying and,

- 3 -

therefore, disallowed as an expense charged to the rate-payers in the PECO rate proceeding at Docket No. R-822291.

4. That the salaries, including fringe benefits, of all PECO employees engaged in Speakers Bureau activities shall be reported to the PUC and a calculation shall be made in order to determine that proportion of each employee's time spent on Speakers Bureau activities, so that in future rate cases an appropriate disallowance shall be made for the amount of time spent by PECO employees which is of no direct benefit to the ratepayers.

5. That expenditures by PECO on behalf of the Utility Nuclear Waste Management Group (UNWMG) shall be classified as a contribution and, therefore, shall not be chargeable to the ratepayers in the rate proceeding at Docket No. R-822291.

6. That expenditures by PECO on behalf of Edison Electric Institute's TMI-related projects shall be classified as a contribution and, therefore, shall not be chargeable to the ratepayers in the rate proceeding at Docket No. R-822291.

7. That expenditures by PECO on behalf of Life Jobs shall be classified as a contribution and, therefore, shall not be chargeable to the ratepayers in the rate proceeding at Docket No. R-822291.

8. That expenditures by PECO on behalf of the American Nuclear Society shall be classified as a contribution and, therefore, shall not be chargeable to the ratepayers in the rate proceeding at Docket No. R-822291.

9. That expenditures by PECO on behalf of Americans for Energy Independence shall be classified as a contribution and therefore, shall not be chargeable to the ratepayers in the rate proceeding at Docket No. R-822291.

10. That expenditures by the Corporate Communications Department in the amount of $2,829,970, less already disallowed expenditures related to the Energy Education Advisory Council, the Utility Nuclear Waste Management Group, Life Jobs, the American Nuclear Society, the Edison Electric Institute-TMI, and the Americans for Energy Independence, are to be disallowed as expenses to be borne by the ratepayers in the PECO rate investigation at Docket No. R-822291.

11. That in all future rate proceedings, PECO is required to specify hours spent by PECO employees in lobbying and to notify the PUC as to the same, so that such expenditures will no longer be borne by the ratepayers.

12.   That all litigation costs incurred by PECO in
the instant case (Keystone Alliance v. Philadelphia Electric
Company, Docket No. C-78080459) shall be disallowed as an
expense to be borne by the ratepayers in the PECO rate
proceeding at Docket No. R-822291 and any future rate pro-
ceedings where allowances for such costs are requested.

13.   That in all future rate proceedings PECO is
required to specify any payments to industry associations
such as the Atomic Industrial Forum, the Edison Electric
Institute, the Pennsylvania Electric Association and any
other industry association to which PECO pays monies, either
on behalf of PECO or its employees, in order to determine
whether any such expenditures are of a direct benefit to the
ratepayers.

14.   That PECO is directed to quantify the annual
revenue impact of the disallowances contained in paragraph
Nos. 1, 2, 3, 5, 6, 7, 8, 9, 10 and 12 above, on base rates
put in effect on November 29, 1983 at the close of our
investigation at Docket No. R-822291, and to serve its
analysis on the Commission and the parties to this pro-
ceeding within twenty (20) days of the entry of this Order.

15.   That the revenue impact of the expense dis-
allowance made here upon PECO's current base rates which
have been in effect since January 25, 1985, is $4,723,000 on
an annual basis.

16.   That PECO is directed to quantify the annual
revenue impact of the disallowances contained in paragraph
Nos. 1 through 13 above for the record in its current base
rate investigation at Docket No. R-850152; to base this
analysis on future test year data in that proceeding and
place it on the record in Docket No. R-850152 within
twenty (20) days of the entry of this Order.

17.   That a copy of this Order be served upon the
parties to this proceeding at Docket No. C-78080459 and all
parties to PECO's current rate investigation at Docket No.
R-850152.

18.   That any party to this proceeding may file
comments or exceptions to this Order no later than
twenty (20) days from the date that it is entered.

19.   That if no comments or exceptions are received by the Commission within twenty (20) days of the entry of this Order it will be deemed a Final Amended Order.

BY THE COMMISSION,

Jerry Rich
Secretary

(SEAL)

ORDER ADOPTED: February 13, 1986

ORDER ENTERED: February 18, 1986

TEST YEAR EXPENSES INCLUDED IN CURRENT AND
PRIOR RATE PROCEEDINGS IDENTIFIED IN PaPUC
TENTATIVE AMENDED ORDER AT DOCKET C-78080459

Docket:	R-822291	R-842590	R-850152
Period Rates in Effect:			
From	11/23/83	1/25/85	6/27/86
To	1/24/85	6/26/86	-
Total Time	14 Months	17 Months	-

Quantification of Expenses
Referenced in Tentative
Amended Order (Annual Basis):

	R-822291	R-842590	R-850152
Ordering Paragraph 1	$ 960,650	$ 767,600	$ 631,412
Ordering Paragraph 2	5,800	6,300	6,600
Ordering Paragraph 3	7,200	9,900	11,000
Ordering Paragraph 4	14,634	16,008	16,000
Ordering Paragraph 5	17,800	20,400	28,400
Ordering Paragraph 6	0	1,000,000	755,830
Ordering Paragraph 7	5,000	53,000	5,600
Ordering Paragraph 8	0	0	42,000
Ordering Paragraph 9	0	0	0
Ordering Paragraph 10	0	0	0
Ordering Paragraph 11	0	0	0
Ordering Paragraph 12	0	0	0
Total	$1,011,084	$1,873,208	$1,469,842
Ordering Paragraph 13	N/A	N/A	$1,147,412(a)

Recovered through rates exclusive of Ordering Paragraph 6 for total rate effective period	$1,179,598	$1,237,045	N/A
Total Recovery		$2,416,643	
Annual Refund over 2 years		$1,208,322	

(a)		
Edison Electric Institute dues	$	627,000
Pennsylvania Electric Association dues		313,937
Electrical Association of Philadelphia		114,800
Atomic Industrial Forum		62,400
American Nuclear Energy Council		20,625
Other		8,650
Total		$1,147,412

(Reference PECo Statement No. 18A)

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

PHILADELPHIA ELECTRIC COMPANY

DOCKET No. R-850152

SUPPLEMENTAL TESTIMONY

OF

THOMAS F. HILL, JR.

ANALYSIS OF THE COMMISSION ORDER
AT DOCKET R-78080459;
EXPLANATION OF CHANGES IN CERTAIN
RATE BASE AND EXPENSE CLAIMS

NOVEMBER, 1985

1 Q. Mr. Hill, have you previously filed Direct Testimony in

2   this case?

3 A. Yes, I have. My Direct Testimony was submitted with the

4   Company's initial filing, on September 27, 1985, as

5   Statement No. 18.

6 Q. What is the purpose of your supplemental testimony?

7 A. The purpose of my supplemental testimony is three-fold: 1)

8   to respond to the Commission's recent Order in the Keystone

9   Alliance Case at Docket No. C-78080459; 2) to present

10   several additions and corrections to the Company's claim as

11   filed to reflect new information and events which have come

12   to the Company's attention after the filing, and 3) to

13   provide the actual results of operations for the first

14   three months of the future test year.

15 Q. Mr. Hill, please describe the results of the Company's

16   review of the Commission's Order at Docket No. C-78080459.

17 A. On September 4, 1985, the Commission entered its final

18   Order in the Keystone Alliance case at Docket No.

19   C-78080459. The Commission's Order finds that certain

20   expenses incurred by the Company should not be recovered

21   from ratepayers, and that the Company should provide

22   information on certain other expenses in future rate

23   proceedings. A copy of the Commission's Order is provided

24   as Schedule 1. The Company believes that the Commission's

25   Order is in error and has appealed the Order to the

26   Commonwealth Court. Therefore, in the Company's view, any

27   adjustment in the current rate proceeding would be

1 premature. However, in order to provide a complete record

2 in this proceeding, the Company has reviewed each of the 13

3 paragraphs in the Commission's Order to determine the

4 amount of expense included in the Company's test year claim

5 in this proceeding for each of the programs and items

6 referenced in the Commission's Order, as follows:

7 <u>Paragraph 1</u>. The total amount of expenditures associated

8 with Energy Education Advisory Council (EEAC) related

9 activities included in the test year is $631,412. These

10 expenses are recorded in FERC Accounts 909, 920, 921.

11 <u>Paragraph 2</u>. Ms. Mollie McCormick is no longer in PECo's

12 Law Department. She is currently employed in Corporate

13 Communications Department's Public Affairs Section. Ms.

14 McCormick's salary is charged below the operating income

15 line to FERC Account 426, along with other lobbying

16 expenses, and therefore is not included in the Company's

17 test year expense claim. The $6,600 in fringe benefits for

18 Ms. McCormick are charged to FERC Account 926 and are

19 included in the test year claim.

20 <u>Paragraph 3</u>. The Company's test year expense claim

21 includes $11,000 as a payment to Reverend Cecil D. Gallup

22 as a consultant to PECo's Corporate Communications

23 Department. This expense is recorded in FERC Account 921.

24 <u>Paragraph 4</u>. The portion of employee salaries and fringe

25 benefits related to Speaker's Bureau activities cannot be

26 directly determined since the Company's payroll system is

27 not designed to provide such an allocation. While the

1   exact costs are not specifically determinable, I have

2   prepared an estimate of these costs. As set forth in

3   Schedule 2, assuming three hours of employee time per

4   program and assuming that all engagements are on Company

5   time, an estimated $54,000 in electric operations employee

6   wages and benefits are attributable to the Speaker's Bureau

7   program. The development of this estimate is shown on

8   Schedule 2. In the Company's view all of the speaking

9   engagements provide important information to ratepayers and

10   therefore are of direct benefit to ratepayers and should be

11   reflected in rates. Moreover, it is the Company's

12   understanding that Judge Kranzel's Recommended Decision was

13   concerned only about speaking engagements on nuclear or

14   nuclear related topics. As shown on Schedule 2,

15   approximately 30% of the speaking engagements deal with

16   nuclear-related topics and the estimated expenses

17   associated with these engagements would be $16,000.

18   However, I should note that this $16,000 estimate is

19   significantly overstated since many of the speaking

20   engagements are on the employees personal time at no cost

21   in salary or fringe benefits to the Company.

22   Paragraph 5. The Company's test year claim contains

23   $28,400 in contributions on behalf of the Utility Nuclear

24   Waste Management Group. This expense is recorded in FERC

25   Account 930.2.

26   Paragraph 6. The Company's test year claim includes

27   $755,830 in expenses for PECo's contribution on behalf of

1   Edison Electric Institute TMI-Projects. This expense is

2   recorded in FERC Account 930.2.

3   Paragraph 7. The Company's test year claim includes $5,600

4   in expenditures on behalf of Life Jobs. This expense is

5   recorded in FERC Account 930.2.

6   Paragraph 8. The Company's test year claim contains

7    $42,000 in expenditures on behalf of the American Nuclear

8   Society. This expense is recorded in FERC Account 930.2.

9   Paragraph 9. The Company's test year claim includes no

10   contributions to or expenditures on behalf of Americans For

11   Energy Independence.

12   Paragraph 10. Budgeted expenditures by Corporate

13   Communications in the current test year, excluding Muddy

14   Run, and less expenditures disallowed in the Commission's

15   Order, exceed the absolute level of 1978's expense by

16    $3,748,432. As shown in Schedule 3 after the application

17   of a wage adjustment to 1978 expenses to account for

18   general wage increases granted by the Company and allowed

19   by this Commission in prior rate orders, the difference is

20   reduced to $1,240,786. Moreover, since 1978 the size and

21   scope of the Corporate Communications Department have grown

22   significantly. The public currently requires significantly

23   more information about Company operations, conservation,

24   safety and rates. As a result of the increase in the

25   public demand for information, Corporate Communications

26   staff has increased from 76 to 95 or 25% since 1978. This

27   increase in staff necessitated by customer and media

1 requirements for information is the primary cause of the
2 $1,240,786 adjusted increase over 1978's level of
3 expenditures. The Company does not believe it was the
4 intent of the Commission's Order to ignore wage inflation
5 and necessary staff increases since 1978, and that the
6 Corporate Communications expense claimed by the Company is
7 just and reasonable when properly compared to 1978 levels.
8 Paragraph 11. Lobbying activities on behalf of PECo are
9 conducted by the Public Affairs Section of the Corporate
10 Communications Department. The Public Affairs Section has
11 five employees, of which four are registered lobbyists.
12 Eighty percent of the Public Affairs Section expenses are
13 charged below the line to lobbying expense in FERC Account
14 426. The remaining 20% of expenses are charged to Electric
15 (Accounts 920 and 921), Gas and Steam Operations. Since
16 all lobbying expenses are booked to Account 426, the
17 Company's test year expense claim contains no lobbying
18 expenses.
19 Paragraph 12. There are no expenses in the test year
20 associated with the litigation of Docket Number C-78080459.
21 Paragraph 13. Schedule 4 provides a list of industry
22 associations to which the Company pays money for itself or
23 its employees. The total amount paid to these associations
24 included in the test year is approximately $1.1 million.
25 This expense is recorded in Account 930.2. Provided below
26 is a description of each association and the benefits to
27 ratepayers of Company membership.

1   The Edison Electric Institute (EEI) is a nationwide
2   industry organization to which the Company belongs. The
3   organization's programs cover numerous areas ranging from
4   Load Research and Rate Design to Depreciation Methods and
5   Accounting Policies to Industry Safety. These committees
6   enable members of the association to keep abreast of
7   current changes or advances in the different areas of the
8   industry. Current information in these areas is necessary
9   to operate a utility properly and therefore benefits the
10   ratepayer through improved operations.

11   The Pennsylvania Electric Association (PEA) is a
12   statewide industry organizaton to which the Company
13   belongs. This association helps the Company keep abreast
14   of the changing regulatory environment through analyzing
15   new and proposed regulations. Current knowledge on the
16   impact of new and proposed legislation is necessary for the
17   Company to properly operate its system and therefore is a
18   proper cost of doing business which directly benefits the
19   ratepayer.

20   The Electrical Association of Philadelphia is an
21   association of electrical contractors. The Company serves
22   as the coordinator of the association. The Association's
23   goal is to assure that all associated contractors maintain
24   proper safety standards and are up to date in industry
25   standards, i.e. ASHRAE Standards. The Company considers it
26   of utmost importance to itself and its ratepayers to have
27   contractors that the ratepayers know will do a safe job and

1   conform to the most recent standards.

2   The Atomic Industrial Forum is a trade association for

3   the nuclear power industry. AIF analyzes new and proposed

4   regulations regarding nuclear power, and monitors new

5   technologies in the industry. Such information, especially

6   regarding the ever-changing technology and regulation of

7   the nuclear industry is of great benefit to companies such

8   as PECo with a large investment in nuclear power. For

9   example, up-to-date knowledge in areas such as spent fuel

10   disposal and safer plant operations provides for safer and,

11   in some cases, improved operations, and clearly benefits

12   ratepayers.

13   The American Nuclear Energy Council monitors current

14   legislation regarding nuclear power. Knowledge of pending

15   changes can be beneficial to the Company for planning

16   purposes. Better planning provides for more efficient

17   operation and thus benefits ratepayers.

18 Q. Mr. Hill, please summarize the additions and corrections to

19   the Company's expense and rate base claim in this

20   proceeding.

21 A. Several additions and corrections have been made to reflect

22   new information, subsequent events and minor errors

23   discovered after filing. These changes consist of: 1) a

24   revision to the insurance claim for Limerick, 2) the

25   addition of a storm damage claim, 3) a revision to local

26   real estate tax expense, 4) a claim to recover the

27   Company's investments in the Sequoyah Uranium Project and

PENNSYLVANIA
PUBLIC UTILITY COMMISSION
Harrisburg, PA 17120

Public Meeting held August 28, 1985

Commissioners Present:

    Linda C. Taliaferro, Chairman, dissenting
    James H. Cawley
    Frank Fischl
    Bill Shane

Keystone Alliance   C-78080459
        V.
Philadelphia Electric Company

O R D E R

BY THE COMMISSION:

        We adopt as our action the Initial Decision of Administrative Law
Judge Isador Kranzel dated August 31, 1983, and that Exceptions be denied;
THEREFORE,

        IT IS ORDERED:

        1. All expenditures by PECO on behalf of its Energy Education Ad-
visory Council programs, including program materials, payments to consultants
and salaries of PECO employees engaged in EEAC-related activities, shall
henceforth be classified as a contribution, with such expenditures being dis-
allowed as an expenditure to be borne by the ratepayers in the current PECO
rate proceeding at R-822291.

        2. The salary, including fringe benefits, of Ms. Mollie McCormick
of PECO's Law Department shall henceforth be classified entirely as lobbying
and, therefore, disallowed as an expense charged to the ratepayers in the
current PECO rate proceeding at R-822291.

        3. All payments to Reverend Cecil D. Gallup, a consultant to the
Corporate Communications Department, shall be classified entirely as lobbying
and, therefore, disallowed as an expense charged to the ratepayers in the
current PECO rate proceeding at R-822291.

        4. Salaries, including fringe benefits, of all PECO employees en-
gaged in Speakers Bureau activities shall be reported to the PUC and a calcu-
lation shall be made in order to determine that proportion of each employee's
time spent on Speakers Bureau activities, so that in future rate cases an
appropriate disallowance shall be made for the amount of time spent by PECO
employees which is of no direct benefit to the ratepayers.

5. Expenditures by PECO on behalf of the Utility Nuclear Waste Management Group (UNWMG) shall be classified as a contribution and, therefore, shall not be chargeable to the ratepayers in the current rate proceeding at R-822291.

6. Expenditures by PECO on behalf of Edison Electric Institute's TMI-related projects shall be classified as a contribution and, therefore, shall not be chargeable to the ratepayers in the current rate proceeding at R-822291.

7. Expenditures by PECO on behalf of Life Jobs shall be classified as a contribution and, therefore, shall not be chargeable to the ratepayers in the current rate proceeding at R-822291.

8. Expenditures by PECO on behalf of the American Nuclear Society shall be classified as a contribution and, therefore, shall not be chargeable to the ratepayers in the current rate proceeding at R-822291.

9. Expenditures by PECO on behalf of Americans for Energy Independence shall be classified as a contribution and, therefore, shall not be chargeable to the ratepayers in the current rate proceeding at R-822291.

10. Expenditures by the Corporate Communications Department in the amount of $2,829,970, less already disallowed expenditures related to the Energy Education Advisory Council, the Utility Waste Management Group, Life Jobs, the American Nuclear Society, the Edison Electric Institute-TMI, and the Americans for Energy Independence, are to be disallowed as expenses to be borne by the ratepayers in the current PECO rate investigation at R-822291.

11. In all future rate proceedings, PECO is required to specify hours spent by PECO employees in lobbying and to notify the PUC as to the same, so that such expenditures will no longer be borne by the ratepayers.

12. All litigation costs incurred by PECO in the instant case (Keystone Alliance v. Philadelphia Electric Company, Docket Number C-78080459) shall be disallowed as an expense to be borne by the ratepayers in the current PECO rate proceeding at R-822291 and any future rate proceedings where allowances for such costs are requested.

13. In all future rate proceedings PECO is required to specify any payments to industry associations such as the Atomic Industrial Forum, the Edison Electric Institute, the Pennsylvania Electric Association and any other industry association to which PECO pays monies, either on behalf of PECO or its employees, in order to determine whether any such expenditures are of a direct benefit to the ratepayers.

BY THE COMMISSION,

(SEAL)

Jerry Rich
Secretary

ORDER ADOPTED: August 28, 1985

ORDER ENTERED: SEP 4 1985

Philadelphia Electric Company

ESTIMATED SPEAKERS BUREAU COSTS

1984 Speaking Engagement Breakdown

	Total Engagements	% of Total	Nuclear or Quasi-Nuclear Related
Conservation	252	27.5%	
Rates	180	19.7	
Nuclear Power	144	15.7	15.7%
Energy Alternatives	133	14.5	14.5
Safety	104	11.3	
Community Programs	103	11.3	
	916	100.0%	30.2%

Assumptions

- 916 is a normal number of engagements
- Three hours per engagement (includes travel time)
- Assume 90% of hours allocated to Electric Operations
- Assume all engagements on Company time.

Calculation of Cost

Total Payroll (Regular Time)	=	$424,256,000	(D-5a, TPH-2)
Total Pensions & Benefits	=	93,420,000	(55,118(C-12a, TPH-2))
			459 (D-5, TPH-2)
Total Labor Related Expenses	=	$517,676,000	
Employees @ 6/30/86	=	11,286	
Average Per Employee	=	$45,869	
Employees Allocated to Electric (a)	=	1.19	
Cost Allocated to Electric	=	$54,370	
Nuclear Related	=	30.2%	(from above)
Total	=	$16,418	

(a)

916		Engagements
x 3		Hours
2,748		Hours
x .9		Allocated to Electric
2,473		Hours
/ 2080		Hours/Person-Year
= 1.19		Person-Years

1978 Corporate Communications Expense (Excluding Muddy Run) = $3,482,841

Wage Increases

1978 = 2.9% (7.0% x 5/12)	1982 = 8.8%
1979 = 7.2	1983 = 6.75%
1980 = 9.5	1984 = 6.0%
1981 = 9.75	1985 = 5.4%

Cumulative Wage Adjustment Factor =
(1.029)(1.072)(1.095)(1.0975)(1.099)(1.0675)(1.06)(1.054)
= 1.72

Inflation Adjusted 1978 Corporate
Communications Expense = $3,482,841 x 1.72 = $5,990,487

Employees in 1978 = 76
Current Level = 95
Increase = 25%

	W/O Inflation	W/Inflation
June 30, 1986 Test Year Corporate Communications =	$8,694,515	$8,694,515
Less: 1978 Corporate Communicatons =	3,482,841	5,990,487
Excess of Test Year Expenses Over the 1978 Level =	$5,211,674	$2,704,028
Less: TMI-Cleanup	755,810 -631,412	755,810 631,412
EEAC Expenses	631,412	631,412
Utility Nuclear Waste Management Group	28,400	28,400
Life Jobs	5,600	5,600
American Nuclear Society	42,000	42,000
Expenses in Excess of 1978 Level	$3,748,432	$1,240,786
Adjustment to Reflect Increase in Staff	870,710 (a)	1,497,672 (a)
Expenses in Excess of the 1978 Level Adjusted for Wage Inflation and Required Staffing Increases	$2,877,222	($256,886)

(a) Adjustment for 25% increase in staff.

	W/O Inflation	W/Inflation
1978 Expense	$3,482,841	$5,990,487
Adjustment @ 25%	870,710	1,497,672 1,397,622

- 1 -

Philadelphia Electric Company

ASSOCIATION DUES
12 MONTHS ENDING JUNE 30, 1986

American Nuclear Energy Council	$20,625
Atomic Industrial Forum	62,400
Edison Electric Institute	627,000
Electrical Association of Philadelphia	114,800
Pennsylvania Electric Association	313,937
Other	8,650
Total	$1,147,412

Q. IR-OCA-13-13.   Re: Statement 18A; Keystone Alliance
                    discussion. Please provide a comparable
                    breakdown for the Company's future test year
                    claims in the following base rate proceedings:
                    R-822291 and R-842590.

A. IR-OCA-13-13.   The following data provides an estimate of the
                    requested data for R-822291 and R-842590
                    comparable to Company Statement 18A.

	12 Months Ending	
	Dec. '84	Oct. '83
	R-842590	R-822291
Paragraph 1	$767,600	$960,650
Paragraph 2	6,300	5,800
Paragraph 3	9,900	7,200
Paragraph 4	Note 1	Note 1
Paragraph 5	20,400	17,800
Paragraph 6	1,000,000	-
Paragraph 7	53,000	5,000
Paragraph 8	-	-
Paragraph 9	-	-
Paragraph 10	Note 2	Note 2
Paragraph 11	-	-
Paragraph 12	-	-
Paragraph 13	Note 3	Note 3

Note 1 - Attachment IR-OCA-13-13a provides the
requested information.
Note 2 - Attachment IR-OCA-13-13b provides the
requested information.
Note 3 - Attachment IR-OCA-13-13c provides the
requested information.

Reponsible Witness: T.P.Hill,Jr.,Asst. Manager-Rate Division

Estimated Speaker's Bureau Expenses

	R-842590 12 Months Ended Dec. 1984	R-822291 12 Months Ended Oct. 1983
Payroll	$404,759,000	$361,224,000
Pensions & Benefits	92,002,000	78,230,000
Disallowance	(15,801,000)	(6,553,000)
Total Allowed Labor Expense	$480,960,000	$432,901,000
Budget Employees	10,798	10,631
Avg./Employee	44,542	40,721
Factor	1.19	1.19
Cost to Electric	$53,005	$48,458
Nuclear Related	30.2%	30.2%
Total	$16,008	$14,634

Philadelphia Electric Company
ESTIMATED CORPORATE COMMUNICATIONS EXPENSE
12 Months Ending December 1984
R-842590

1978 Corporate Communications Expense (Excluding Muddy Run) = $3,482,841

Wage Increases

1978 = 2.9% (7.0% x 5/12)	1982 = 8.8%
1979 = 7.2%	1983 = 6.75%
1980 = 9.5%	1984 = 6.0%
1981 = 9.75%	

Cumulative Wage Adjustment Factor =
$(1.029)(1.072)(1.095)(1.0975)(1.088)(1.0675)(1.06) = 1.63$

Inflation Adjusted 1978 Corporate Communications Expense =
$3,482,841 x 1.63 = $5,677,031

	W/O Inflation	W/Inflation
Dec. 31, 1984 Test Year Corporate Communications =	$7,416,786	$7,416,786
Less: 1978 Corporate Communications =	3,482,841	5,677,031
Excess of Test Year Expenses Over the 1978 Level =	$3,933,945	$1,739,755
Less: TMI Cleanup	1,000,000	1,000,000
EEAC Expenses	767,600	767,600
Utility Nuclear Waste Management Group	20,400	20,400
Life Jobs	53,000	53,000
American Nuclear Society	-	-
Expenses in Excess of 1978 Level	$2,092,945	($101,245)
Adjustment to Reflect Increase in Staff	870,710 (a)	1,419,258 (a)
Expenses in Excess of the 1978 Level Adjusted for wage inflation and required staffing increases	$1,222,235	($1,520,503)

(a) Adjustment for 25% increase in staff.

	W/O Inflation	W/Inflation
1978 Expense	$3,482,841	$5,677,031
Adjustment @ 25%	870,710	1,419,258

Philadelphia Electric Company
ESTIMATED CORPORATE COMMUNICATIONS EXPENSE
12 Months Ending October 1983
R-822291

1978 Corporate Communications Expense (Excluding Muddy Run) = $3,482,841

Wage Increases

1978 = 2.9% (7.0% x 5/12)	1981 = 9.75%
1979 = 7.2%	1982 = 8.8%
1980 = 9.5%	1983 = 5.63% (10/12 x 6.75%)

Cumulative Wage Adjustment Factor =
$(1.029)(1.072)(1.095)(1.0975)(1.088)(1.0563) = 1.52$

Inflation Adjusted 1978 Corporate Communications Expense =
$3,482,841 x 1.52 = $5,293,918

	W/O Inflation	W/Inflation
Oct. 31, 1983 Test Year Corporate Communications =	$5,302,548	$5,302,548
Less: 1978 Corporate Communications =	3,482,841	5,293,918
Excess of Test Year Expenses Over the 1978 Level =	$1,819,707	$8,630
Less: TMI Cleanup	–	–
EEAC Expenses	960,650	960,650
Utility Nuclear Waste Management Group	17,800	17,800
Life Jobs	5,000	5,000
American Nuclear Society	–	–
Expenses in Excess of 1978 Level	$836,257	($974,820)
Adjustment to Reflect Increase in Staff	870,710 (a)	1,323,480 (a)
Expenses in Excess of the 1978 Level Adjusted for wage inflation and required staffing increases	($34,453)	($2,298,300)

(a) Adjustment for 25% increase in staff.

	W/O Inflation	W/Inflation
1978 Expense	$3,482,841	$5,293,918
Adjustment @ 25%	870,710	1,323,480

Philadelphia Electric Company

ESTIMATED ASSOCIATION DUES

	R-842590 12 Months Ending Dec. 1984	R-822291 12 Months Ending Oct. 1983
American Nuclear Energy Council	20,250	20,250
Atomic Industrial Forum	53,000	61,200
Edison Electric Institute	530,000	512,000
Electrical Association of Philadelphia	106,480	101,600
Pennsylvania Electric Association	300,000	250,000
Total	$1,009,730	$945,050

PECO STATEMENT NO. 18J

Sur
3-72-86
Hng
R-850152

PENNSYLVANIA PUBLIC UTILITY COMMISSION

v.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

ADDITIONAL SUR-SURREBUTTAL TESTIMONY

OF THOMAS P. HILL, JR.

RE: LIMERICK RELATED ISSUES FROM TRIAL STAFF

MARCH 1986

ADDITIONAL SUR-SURREBUTTAL TESTIMONY OF THOMAS P. HILL, JR.

Q. Are you the same Mr. Hill who has previously filed direct, rebuttal and sur-surrebuttal testimony in this proceeding?

A. Yes. I have previously submitted direct testimony identified as PECo Statements No. 18, 18A, 18B and 18I. I have submitted rebuttal testimony identified as PECo Statements No. 18C, 18D, 18E and 18F, and I have submitted sur-surrebuttal testimony identified as PECo Statements No. 18G and 18H.

Q. What is the purpose of this sur-surrebuttal testimony?

A. This sur-surrebuttal testimony will respond to the issue of quantification of revenue requirements resulting from an earlier in-service date for Limerick Unit No. 1 discussed in the surrebuttal testimony of Trial Staff Witnesses Dougherty and Rosenthal. Specifically, I will contrast my current revenue requirements analysis with prior analyses done by this Company to calculate the revenue requirement effects on customers resulting from changes in service date; I will discuss my assumption of a Limerick No. 1 derating during the period June through September 1985 due to water unavailability; I will discuss the use of actual fuel prices in my analysis as well as estimates for non-fuel operation and maintenance expense for Limerick Unit No. 1; I will discuss the present worth factors and the effects of compounding utilizing monthly present worth factors; and finally, I will discuss my adjustments to capital costs associated with the change in accounting for PURTA taxes.

Q. Mr. Hill, would you please discuss and contrast your current revenue requirements analysis as set forth in your rebuttal Statements Nos. 18D and 18E with prior revenue requirements analyses performed by the Company in March and October 1977?

A.	In his surrebuttal testimony, Mr. Rosenthal argues that the quantification analyses I presented in my rebuttal Statements 18D and 18E are inconsistent with studies made nine years ago in that the current analyses include the effects on customers of the future replacement unit while the former studies failed to make such a replacement.

The intent of the current quantification analyses is to include all of the costs which the ratepayers would have to bear as a consequence of an earlier service date. Certainly, if Limerick 1 with a finite 39-year service life were to be put into service 27 months early, then 39 years from now it would have to be replaced by another unit. This replacement would occur 27 months earlier than if the unit had gone into service as it actually did in February 1986. The revenue effects of this advancement in the service date of the replacement unit must be included in the quantification to derive a fair and complete comparison of alternatives. It is a very real and measurable cost effect of the difference in service dates and cannot be ignored. For this 27-month period, a coal unit was selected as the most likely replacement unit.

Since Mr. Rosenthal accepts that it is appropriate to recognize that an earlier service date would have produced energy savings from Limerick 1 for customers in the period November 1983 to February 1986, then it is just as appropriate to recognize the loss of comparable energy savings for customers in the period July 2022 to October 2024. In this case, Limerick 1 energy savings are replaced by the savings from the coal unit. The studies of October 1977 and March 1977 mentioned by Mr. Rosenthal as having omitted consideration of timing of future replacement units were simply in error. They would have been more complete and more accurate had they included such consideration.

Inclusion of the costs of future replacement units is correct and appropriate when quantifying the effects on revenue requirements of alternative service dates.

Q. Mr. Hill, would you please discuss your use of actual fuel prices in the determination of energy savings for Limerick Unit No. 1 with the assumption of a November 1983 in-service date?

A. Mr. Rosenthal asserts that an approach to the quantification analyses which would be untainted by hindsight requires that fuel price estimates as of November 1983 be employed rather than actual data. This certainly might have been appropriate in 1983, when actual fuel prices were unknown and if we were attempting to quantify revenue requirements at that time. However, the purpose of my quantification analysis is to determine in this rate proceeding, as accurately as possible, the effects on the revenues paid by customers had Limerick 1 gone into service in November 1983 rather than in February 1986. Why stand in November 1983 and make such an analysis and exclude known data? We are able to stand in February 1986, use actual data for the period November 1983 through February 1986, and thus achieve a greater measure of accuracy. Mr. Rosenthal's criticism simply has no merit if one's purpose is to accurately quantify cost effects of alternative service dates. One cannot achieve accuracy by ignoring known facts.

Q. Would you please discuss your reasons for utilizing a derating for Limerick Unit No. 1 during the period June through September 1975 based upon water unavailability, and in addition, would you quantify the revenue requirement impact if this assumption were not incorporated in your analysis?

A. In his direct testimony (Statement No. 1), Mr. Boyer discusses water availability restrictions for Limerick in the 1985 period due to the drought conditions

prevailing during that year. It is possible that there would not have been sufficient water during the summer months of 1985 to have permitted full operation of Limerick No. 1 had the plant been licensed to operate. The resultant derating for Limerick No. 1 for that period is properly reflected in my quantification analyses of Statements 18D and 18E.

These analyses, with Limerick No. 1 derated, reflected fuel savings from operation of Limerick No. 1 of $99 million for calendar year 1985. Had this assumption not been incorporated in the analysis, the fuel savings from operation of Limerick No. 1 would have increased to $149 million in 1985. Schedule 1 of my Statement 18E shows that an increase in present worth of revenue requirements resulting from a November 1983 service date amounts to $352 million, including the $99 million fuel savings for Limerick for 1985. If the water restriction for 1985 were ignored and the $149 million of fuel savings utilized for 1985, there would still be a $298 million present worth benefit to the actual February 1986 service date for Limerick 1. Similarly, the net savings of the February 1986 service date employing Limerick and 50% of Common would be reduced from $469 million to $415 million. However, I do not agree that this derating should be ignored.

Q. Mr. Hill, Mr. Rosenthal appears to question your use of real growth in the determination of nuclear non-fuel O&M for Limerick No. 1. Would you further define and explain the assumptions utilized in your analysis?

A. To determine station O&M for Limerick No. 1 in years 1983, 1984 and 1985, the $79.01 million of station O&M for 1986 was used as a starting point. This amount was reduced to 1985, 1984 and 1983 levels using inflation rates of 4.5% for 1986 over 1985, 3.6% for 1985 over 1984 and 3.8% for 1984 over 1983; plus a 3% real

-4-

growth rate for each year. The 3% real growth rate was the same rate we had

used, in addition to inflation rates, to escalate the $79.01 million beyond 1986.

Mr. Rosenthal suggests that a consistent assumption, parallel to the fuel savings

assumption of using actual costs, would be to use actual real growth factors for

the years 1983 through 1985 in lieu of the assumed 3% real growth. To test the

effect of using Mr. Rosenthal's proposal, we have recalculated station O&M for

years 1983 through 1986 using a 3% real growth for 1986 over 1985 (the actual is

not known yet), 18.7% for 1985 over 1984 and 6.9% for 1984 over 1983. The

estimates of what station O&M would have been for the period November 1983

through February 1986, as calculated in Schedule 7.7 in Statement 18D and as

would have been calculated with Mr. Rosenthal's proposal are as follows:

Station O&M

(Million $)

		Method Used In PECo Stmt. 18D	Method Proposed by Mr. Rosenthal	Difference
Nov. 20 to Dec.	1983	$ 8	$ 7	($ 1)
	1984	69	60	(9)
	1985	73	73	0
Jan. to Mid-Feb.	1985	10	10	0
Totals		$160	$150	($10)

Schedule 1 of my Statement 18E shows that an increase in present worth of

revenue requirements resulting from a November 1983 service date amounts to

$352 million, including the station O&M as calculated in PECo Statement 18D.

Even if the method proposed by Mr. Rosenthal were used, the benefit to customers

1
2 in present worth of revenue requirements with the actual February 1986 service
3 date would still amount to $338 million. A similar reduction of $14 million should
4
5 be made to reflect this correction as respects Limerick No. 1 and 50% of
6
7 Common.
8
9 Q. Mr. Rosenthal detects an "internal compounding" error when you employ your
10
11 monthly present worth factors in concert with your annual present worth factors.
12
13 Is there in fact a compounding effect reflected in your numbers, and if so, would
14
15 you quantify the revenue requirement effect in your analysis?
16
17 A. Mr. Rosenthal uses a one-step method of present worthing for periods containing
18
19 full years plus partial years. I used a two-step method applying an annual present
20
21 worth factor for the number of full years and monthly present worth factors based
22
23 upon one-twelfth of the annual rate for the number of months. Mr. Rosenthal's
24
25 method incorporates a monthly factor that is more compatible with the annual
26
27 factor.
28
29 Employing Mr. Rosenthal's methodology reduces my present worth of
30
31 revenue requirements benefit for February 1986 service from $352 million to $331
32
33 million for Limerick 1 and 100% of Common Plant and from $469 million to $448
34
35 million for Limerick 1 and 50% of Common Plant.
36
37 Q. Finally, would you please discuss Mr. Dougherty's and Mr. Rosenthal's concerns for
38
39 capitalizing additional PURTA taxes on the Limerick project with the assumption
40
41 of an earlier in-service date?
42
43 A. Both Mr. Rosenthal and Mr. Dougherty appear to question my adjustment to
44
45 reflect additional capitalized PURTA taxes resulting from the acceleration of
46
47 construction for Limerick No. 1 and Common Plant. As I have indicated, prior to
48
49 April 1982, Philadelphia Electric Company capitalized all PURTA taxes on
50

-6-

projects under construction. Effective April 1982, the Company revised its practice and began expensing PURTA taxes and recovering these expenses currently from customers through the State Tax Adjustment mechanism. This accounting practice was utilized by PECo and was accepted by the Commission in each of its filings for revision to the Company's State Tax Adjustment surcharge. My revisions to Mr. O'Brien's cash flows to reflect this accounting practice utilized by Philadelphia Electric Company are required to properly state the capital costs associated with an earlier in-service date for Limerick Unit No. 1 since this indeed was the actual accounting procedure utilized by Philadelphia Electric during the construction period. This is equally applicable to Mr. Dougherty's calculations.

It is true that Philadelphia Electric Company recovered PURTA tax expense from customers through the State Tax Adjustment mechanism beginning in April 1982. I have already reflected the revenue requirements associated with the recovery of realty tax expense from the in-service date of the plant throughout its useful life by including in my carrying charge analysis the specific revenue requirements associated with the recovery of realty tax. Schedule 1 attached to this testimony now provides an analysis of the revenue requirements associated with the interim period (i.e., from April 1982 through commercial operation date) for both Limerick No. 1 and Common Plant as it was actually constructed to a February 1986 service date and from April 1982 through November 1983 on the assumption utilized by Mr. O'Brien for service for the Limerick facility. As this analysis indicates, on a present worth basis, the revenue requirements for Limerick, assuming the February 1986 service date, should be increased by $80 million and the revenue requirements for Limerick, assuming the

-7-

November 1983 service date, should increase by $48 million. The net impact on customers for PURTA tax expense during this interim period is a net cost to customers of $32 million for the February 1986 service date, for both the Limerick No. 1 and 100% of Common and Limerick No. 1 and 50% of Common cases.

However, reflection of this additional cost in my total revenue requirements analysis does not affect my overall conclusion that completion of Limerick to its actual in-service date of February 1986 provided a net present worth benefit to customers.

Q. Do you have any further comments on the PURTA tax issue as discussed by Trial Staff Witnesses?

A. Yes. In reviewing my testimony in light of the testimony presented by Trial Staff Witnesses, I have determined that I understated the PURTA tax base utilized in the analysis of revenue requirements for the November 1983 service date for Limerick Unit No. 1 and Common Plant. Page 3 of Schedule 1.4 and page 3 of Schedule 2.4 in PECo Statement No. 18E indicate a total PURTA tax base with the O'Brien cash flow of $707,600,000 for Limerick No. 1 and 100% of Common and $512,704,000 for Limerick No. 1 and 50% of Common. These balances are understated since they represent only the PURTA tax base through April 1982 and exclude the additional accruals of AFUDC from April 1982 through November 1983. The actual PURTA tax bases that should have been employed were $821,232,000 for Limerick No. 1 and 100% of Common and $594,944,000 for Limerick 1 and 50% of Common. A recalculation of the present worth of revenue requirements on the O'Brien plant increases the benefit of the February 1986 completion over the November 1983 completion by $29 million for Limerick No. 1

and 100% of Common and by $25 million for Limerick No. 1 and 50% of Common. Revised Schedules 1, 1.2, 2, and 2.2 to PECo Statement No. 18E incorporating the proper realty tax base are attached to this testimony.

Q. Incorporating Staff's adjustments to your analysis for water availability, real growth for nuclear operating and maintenance, adjustments for monthly compounding and PURTA taxes expensed and capitalized, what are the results of your revenue requirements analysis?

A. Employing these staff adjustments, including revisions to the PURTA tax base, yields a present worth benefit to February 1986 completion over the November 1983 completion (O'Brien) of $260 million for Limerick No. 1 and 100% of Common and $373 million for Limerick 1 and 50% of Common.

Q. Does this conclude your sur-surrebuttal testimony of Trial Staff Witnesses on Limerick related issues?

A. Yes.

CHANGE IN PURTA REALTY TAX EXPENSES
APRIL 1982 TO DECEMBER 1985
(MILLION $)

Period (1)	No. of Years(n) and Months (m) to June 1986		Change in Expenses (4)	Future Worth Factors, (P/F,9.70%,n) (5)	Future Worth Factors, (P/F,9/70%/12,m) (6)	Present Worth Year Ended June 1986 (7)=(4) x(5)x(6)
	n (2)	m (3)				
PURTA Expenses With February 1986 Service Date						
9 Mos End Dec 1982	3	6	$9	1.320	1.049	$12
12 Mos End Dec 1983	2	6	14	1.203	1.049	18
12 Mos. End Dec 1984	1	6	17	1.097	1.049	20
12 Mos End Feb 1985	0	6	22	1.000	1.049	23
2 Mos End Feb 1986	0	5	3	1.000	1.041	3
Total						
a. Excluding gross receipts tax						$76
b. Including gross receipts tax						$80
PURTA Expenses With November 1983 Service Date						
9 Mos End Dec 1982	3	6	$16	1.320	1.049	$22
11 Mos End Nov 1983	2	7	19	1.203	1.058	24
Total						
a. Excluding gross receipts tax						$46
b. Including gross receipts tax						$48
Change in Present Worth of Revenue Requirements at June 30, 1986						($32)

CHANGES IN TOTAL REVENUE REQUIREMENTS FOR LIMERICK NO. 1 AND 100% OF COMMON BASED ON PLACING THESE FACILITIES IN SERVICE IN NOVEMBER 1983 RATHER THAN IN FEBRUARY 1986
(Million $)

	Change in Present Worth of Revenue Requirements at June 30, 1986		
	As Presented	As Corrected	Difference
1. Annual carrying charge differential for capital costs of Limerick No. 1 and 100% of common based on change in service date (Schedule 1.2, revised 3/10/86))	($91)	($63)	$28
2. Change in fuel expenses and non-fuel O&M expenses in period November 1983 to February 1986 (From PECo Statement 18D, Schedule 7.5)	(146)	(146)	0
3. Additional Carrying charges for capital costs of coal unit replacing Limerick No. 1 from July 2022 to October 2024 (From PECo Statement 18D, Schedule 7.8)	169	169	0
4. Change in fuel expenses and non-fuel O&M expenses in period July 2022 to October 2024 (From PECo Statement 18D, Schedule 7.10)	65	65	0
5. Change in Customer Revenue Requirements from 1975 to Maintain Mortgage Coverage for Earlier Service Date (Schedule 1.8)	339	339	0
6. Total change in present worth of revenue requirements			
a. Excluding gross receipts tax	$336	$364	$28
b. Including gross receipts tax	$352	$381	$29

---

* Revised to include additional AFUDC in the PURTA realty tax base for the period April 1982 (when capitalization of the PURTA tax ceased) to November 1983 (O'Brien's assumption of the service date for Limerick No. 1).

ANNUAL CARRYING CHARGES FOR CAPITAL COSTS
OF LIMERICK NO. 1 AND 100% OF LIMERICK COMMON
WITH SERVICE DATE OF NOVEMBER 1983
(MILLION $)

Year Ended November	No. of Years(n) and Months(m) To June 1986		Annual Carrying Charges	Future&Present Worth Factors (F/P,9.70%,n) or (P/F,9.70%,n)	Future&Present Worth Factors (F/P,9/70%/12,m) or (P/F,9/70%/12,m)	Present Worth at June 30, 1986
	n	m				
(1)	(2)	(3)	(4)from 1.4	(5)	(6)	(7)=(4)x(5)x(6)
1984	1	7	$727	1.097	1.058	$844
1985	0	7	693	1.000	1.058	733
1986	0	5	662	1.000	0.961	636
1987	1	5	634	0.912	0.961	556
1988	2	5	606	0.830	0.961	483
1989	3	5	578	0.757	0.961	420
1990	4	5	550	0.691	0.961	365
1991	5	5	523	0.629	0.961	316
1992	6	5	495	0.574	0.961	273
1993	7	5	467	0.523	0.961	235
1994	8	5	457	0.477	0.961	209
1995	9	5	445	0.435	0.961	186
1996	10	5	433	0.396	0.961	165
1997	11	5	421	0.361	0.961	146
1998	12	5	409	0.329	0.961	129
1999	13	5	397	0.300	0.961	114
2000	14	5	385	0.274	0.961	101
2001	15	5	372	0.247	0.961	88
2002	16	5	360	0.227	0.961	79
2003	17	5	348	0.207	0.961	69
2004	18	5	336	0.189	0.961	61
2005	19	5	324	0.172	0.961	54
2006	20	5	312	0.157	0.961	47
2007	21	5	300	0.143	0.961	41
2008	22	5	287	0.130	0.961	36
2009	23	5	275	0.119	0.961	31
2010	24	5	263	0.108	0.961	27
2011	25	5	251	0.099	0.961	24
2012	26	5	239	0.090	0.961	21
2013	27	6	227	0.082	0.961	18
2014	28	5	215	0.075	0.961	15
2015	29	5	203	0.068	0.961	13
2016	30	5	190	0.062	0.961	11
2017	31	5	178	0.057	0.961	10
2018	32	5	166	0.052	0.961	8
2019	33	5	154	0.047	0.961	7
2020	34	5	142	0.043	0.961	6
2021	35	5	130	0.039	0.961	5
2022	36	5	118	0.036	0.961	4

Total Schedule 1.2 (November 1983 Service Date) $6,586

Total Schedule 1.1 (February 1986 Service Date) $6,649

Change in Present Worth of Revenue Requirements
  with a November 1983 Service Date ($6,586 - $6,649)   ($63)

CHANGES IN TOTAL REVENUE REQUIREMENTS FOR LIMERICK NO. 1 AND 50% OF COMMON
BASED ON PLACING THESE FACILITIES IN SERVICE IN
NOVEMBER 1983 RATHER THAN IN FEBRUARY 1986
(Million $)

	Change in Present Worth of Revenue Requirements at June 30, 1986		
	As Presented	As Corrected	Difference
1. Annual carrying charge differential for capital costs of Limerick No. 1 and 100% of common based on change in service date (Schedule 2.2, revised 3/10/86)	$21	$45	$24
2. Change in fuel expenses and non-fuel O&M expenses in period November 1983 to February 1986 (From PECo Statement 18D, Schedule 7.5)	(146)	(146)	0
3. Additional Carrying charges for capital costs of coal unit replacing Limerick No. 1 from July 2022 to October 2024 (From PECo Statement 18D, Schedule 7.8)	169	169	0
4. Change in fuel expenses and non-fuel O&M expenses in period July 2022 to October 2024 (From PECo Statement 18D, Schedule 7.10)	65	65	0
5. Change in Customer Revenue Requirements from 1975 to Maintain Mortgage Coverage for Earlier Service Date (Schedule 2.8)	339	339	0
6. Total change in present worth of revenue requirements			
a. Excluding gross receipts tax	$448	$472	$24
b. Including gross receipts tax	$469	$494	$25

---

*Revised to include additional AFUDC in the PURTA realty tax base for the period April 1982 (when capitalization of the PURTA tax ceased) to November 1983 (O'Brien's assumption of the service date for Limerick No. 1)

ANNUAL CARRYING CHARGES FOR CAPITAL COSTS
OF LIMERICK NO. 1 AND 50% OF LIMERICK COMMON
WITH SERVICE DATE OF NOVEMBER 1983
(MILLION $)

Year Ended November	No. of Years(n) and Months(m) To June 1986		Annual Carrying Charges	Future&Present Worth Factors (F/P,9.70%,n) or (P/F,9.70%,n)	Future&Present Worth Factors (F/P,9/70%/12,m) or (P/F,9/70%/12,m)	Present Worth at June 30, 1986
	n	m				
(1)	(2)	(3)	(4)from 2.4	(5)	(6)	(7)=(4)x(5)x(6)
1984	1	7	$614	1.097	1.058	$713
1985	0	7	585	1.000	1.058	619
1986	0	5	559	1.000	0.961	537
1987	1	5	535	0.912	0.961	469
1988	2	5	512	0.830	0.961	408
1989	3	5	488	0.757	0.961	355
1990	4	5	465	0.691	0.961	309
1991	5	5	442	0.629	0.961	267
1992	6	5	418	0.574	0.961	231
1993	7	5	395	0.523	0.961	199
1994	8	5	387	0.477	0.961	177
1995	9	5	376	0.435	0.961	157
1996	10	5	366	0.396	0.961	139
1997	11	5	356	0.361	0.961	124
1998	12	5	346	0.329	0.961	109
1999	13	5	335	0.300	0.961	97
2000	14	5	325	0.274	0.961	86
2001	15	5	315	0.247	0.961	75
2002	16	5	305	0.227	0.961	67
2003	17	5	294	0.207	0.961	58
2004	18	5	284	0.189	0.961	52
2005	19	5	274	0.172	0.961	45
2006	20	5	264	0.157	0.961	40
2007	21	5	253	0.143	0.961	35
2008	22	5	243	0.130	0.961	30
2009	23	5	233	0.119	0.961	27
2010	24	5	223	0.108	0.961	23
2011	25	5	212	0.099	0.961	20
2012	26	5	202	0.090	0.961	17
2013	27	6	192	0.082	0.961	15
2014	28	5	182	0.075	0.961	13
2015	29	5	171	0.068	0.961	11
2016	30	5	161	0.062	0.961	10
2017	31	5	151	0.057	0.961	8
2018	32	5	141	0.052	0.961	7
2019	33	5	131	0.047	0.961	6
2020	34	5	120	0.043	0.961	5
2021	35	5	110	0.039	0.961	4
2022	36	5	100	0.036	0.961	3

Total Schedule 2.2 (November 1983 Service Date) $5,567

Total Schedule 2.1 (February 1986 Service Date) $5,522

Change in Present Worth of Revenue Requirements
    with a November 1983 Service Date ($5,567 - $5,522) $45

PENNSYLVANIA PUBLIC UTILITY COMMISSION

V.

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

REBUTTAL TESTIMONY

OF

GEORGE R. SCHINK

CRITIQUE OF THE STARLOC MODEL AND

TESTIMONY PRESENTED BY DR. ARIE SCHINNAR

FEBRUARY 19, 1986

REBUTTAL TESTIMONY OF DR. GEORGE R. SCHINK

1
2
3   Q.   Please state your full name and business address for the record.
4
5   A.   George R. Schink.   My business address is Wharton Econometric Forecasting
6
7   Associates, Inc., 3624 Science Center, Philadelphia, Pennsylvania 19104.
8
9   Q.   By whom are you employed, and in what capacity?
10
11   A.   I am Vice President for Research and Development at Wharton Econometric
12
13   Forecasting Associates, Inc. (WEFA).   I am responsible for the development,
14
15   enhancement, specification, and maintenance of the WEFA econometric models.
16
17   WEFA has developed large econometric models of the United States
18
19   economy that are used regularly to prepare forecasts and to analyze the impacts of
20
21   policy changes on the United States economy.   WEFA also has developed
22
23   econometric models of many regional economies, including the Philadelphia MSA.
24
25   WEFA is considered to be one of the preeminent forecasting organizations in the
26
27   world utilizing econometric models.
28
29   Q.   Please describe briefly the econometric modeling experience you have had at
30
31   WEFA.
32
33   A.   While at WEFA, I have directed the development of the Wharton Long Term Model
34
35   of the United States economy.   Under my direction, the model was expanded from
36
37   an 850 variable model to more than a 2200 variable model.   This expansion included
38
39   the introduction of extensive energy detail.   While under development, the version
40
41   of the Long Term Model containing the energy detail was referred to as the
42
43   Wharton Energy Model.   The primary emphasis in including the energy detail was to
44
45   capture properly the energy-economy interactions.   Also, I have directed several
46
47   regional economic modeling efforts and have conducted economic impact analyses
48
49   using these models.   My Curriculum Vitae is attached hereto as Exhibit GRS-1.
50

1	Q. Have you testified previously in this proceeding?
2	
3	A. No. However, I did testify in the Limerick Unit No. 2 Investigation at Docket No.
4	
5	I-840381.
6	
7	Q. What is the purpose of your rebuttal testimony?
8	
9	A. I have been asked to comment on the testimony presented by Arie P. Schinnar,
10	
11	Ph.D. (City Statement No. 1) and the STARLOC model that provides the basis for
12	
13	his testimony.
14	
15	Q. Dr. Schink, could you indicate the information you have reviewed to evaluate the
16	
17	testimony presented by Dr. Schinnar?
18	
19	A. Yes. I have studied his written testimony, which is City Statement No. 1, and a
20	
21	technical report, Wharton PMW Report No. 8618, which is PECO Exhibit 22. I also
22	
23	have reviewed the transcript of Dr. Schinnar's cross-examination, which was
24	
25	conducted on Thursday, February 13, 1986. Finally, I was one of the PECO
26	
27	consultants who met with Dr. Schinnar at his offices. I was present for the entire
28	
29	day on Monday, February 10, 1986 and for the morning on Tuesday, February 11,
30	
31	1986. In addition, I have consulted with the other PECO experts who have reviewed
32	
33	Dr. Schinnar's model with him.
34	
35	Q. After your review of Dr. Schinnar's materials, do you have questions or concerns
36	
37	regarding his analysis or conclusions?
38	
39	A. Yes. Dr. Schinnar argues that an electricity rate increase of 28.2 percent over 3
40	
41	years would reduce job growth by 19,196 in the Philadelphia region. This job growth
42	
43	reduction is estimated using a model of the Philadelphia region (or MSA) which, in
44	
45	the documents provided by Dr. Schinnar, is referred to by the acronym STARLOC.
46	
47	Therefore, a thorough understanding of how STARLOC functions is essential to an
48	
49	assessment of the reasonableness of his alleged linkage between electricity rate
50	

changes and changes in job growth. To obtain a thorough understanding of the functioning of STARLOC, I, as well as any other analyst, would need complete written technical model documentation, continuing access to the actual computer code used to perform the calculations with STARLOC, and the ability to perform simulation experiments with the model where all of the model calculations could be examined and the results observed. Unfortunately, the written technical documentation for STARLOC is in draft form and is incomplete, the computer code was available only for brief review at Dr. Schinnar's office on Tuesday, February 11, 1986, which was insufficient to gain any insight into the functioning of the system, and when simulations were performed with STARLOC, I could only observe the results of a subset of the model's calculations. Therefore, I have had to evaluate STARLOC on the basis of limited, and I believe, inadequate documentation and information.

Q. Are there generally accepted standards for documenting a model and procedures for evaluating models?

A. Yes, but these standards and procedures are far from rigid. Several teams of experts have developed standards and procedures which differ in detail but which are consistent in principle and effect. The Electric Power Research Institute (EPRI) has commissioned several research efforts that were intended to establish guidelines for documenting and evaluating models. Perhaps the most relevant in this context is a study conducted by Edwin Kuh and David Wood of the Massachusetts Institute of Technology entitled Independent Assessment of Energy Policy Models, (EPRI EA-1071, Project 1015-1, Final Report, May, 1979). A related study, also done for EPRI, applying these principles, entitled Energy Supply and Demand Properties From Engineering Process Models, (EPRI EA-1568, Project

1055-1, Final Report, October, 1980), was prepared by Russel G. Thompson and others from the University of Houston. These studies differ in some of the finer details of model evaluation, but agree on the key points including:

o   The need for complete written technical documentation describing the database, the model's structure, the model estimation/development process and results, and a complete presentation of model parameters;

o   The need for access to the computer code used to perform the calculations with the model and for complete documentation of this computer code; and

o   The ability to perform simulations with the model and to examine the results of all calculations (including intermediate calculations) performed within the model during these simulations.

Given the above information and access to a model, one can assess the properties and capabilities of a model. WEFA's models routinely have been subjected to just such scrutiny. Without such documentation, a model as large and complex as STARLOC is little more than a "black box" to experts as well as to laymen.

Q.   Do you view requests for access to complete model documentation, to the computer code, and to a complete printout of all the model's calculations as an undue burden?

A.   No. If policy makers are to use information produced by these models as input into their decision-making process, then these models must be open fully to public scrutiny and review. To evaluate properly a model and the results produced by the model, all this information and documentation must be available. If a model's output is to be used in the policy making process, then the model builder must provide detailed model documentation and must allow access by reviewers to all final and intermediate model calculations. This documentation and access is

1 essential for public validation of the model. Such public validation is critical if a

3 policy/maker is to rely on the model's results with any degree of confidence.

5 Q. Does the STARLOC model meet that standard?

7 A. No.

9 Q. Do you believe that you have been provided with sufficient information about, and

11 access to, the STARLOC model to develop a sufficient understanding of the model's

13 properties and, more specifically, its appropriateness for the analysis of the

15 economic impacts of electric rate changes?

17 A. No. We can observe the inputs and a summary of the model outputs, chosen by Dr.

19 Schinnar, but we cannot examine the complete set of model outputs. We have been

21 provided with draft technical documentation which is incomplete and which refers

23 to uncompleted further reports for greater specification and clarification. Finally,

25 we were not permitted the opportunity for our own programmers to work with the

27 computer code for STARLOC so we could determine precisely how various

29 calculations (including intermediate calculations) were done.

31 Q. Could you provide us with an explanation of why you need more than just summary

33 information to verify the appropriateness of STARLOC for this analysis and to

35 determine the validity of the results?

37 A. Yes. In his testimony on pages 18 and 19, Dr. Schinnar indicates that the STARLOC

39 model computes a job growth reduction of 19,196 when electric rates are raised by

41 28.2 percent over a 3 year period and the overall inflation rate was assumed to be 5

43 percent (assuming no growth trend). The real growth in electric rates in this case is

45 12.4 percent obtained by subtracting the compound general inflation rate over 3

47 years of 15.8 percent from the 28.2 percent nominal increase in electricity prices.

49 The STARLOC model does not contain an equation (or relationship) that relates

change in job growth to change in the real growth in electric rates. Instead, this estimated reduction in job growth is the result of the solution of a sequence of sets of equations and in fact requires that the equations be solved several times (iterated) because of the simultaneous nature of the model. The sequence of calculations includes the following:

- Calculation of the change in the prices for the 22 industries in STARLOC other than electricity which would result from the change in electricity prices.

- Calculation of the reduction in final and intermediate demand for the output of the 23 industries in STARLOC due to the increase in prices induced by the electricity price increase.

- Calculation of the reduction in employment for 23 industries due to the reduction in final and intermediate demand.

- Calculation of the reduction of household income and expenditures due to the reduction in employment.

- Calculation of the reduction in consumer final demands for output by industry due to the reduction in household expenditures.

- Calculation of the additional reduction in employment due to the above induced reduction in consumer final demands leading ultimately to further declines in final demand.

- At the same time, STARLOC also calculates the reduction in energy demands for the residential sector which modifies the final demand sector, calculates the changes in energy and labor requirements within the commercial and industrial sector and modifies the technical coefficients in the input-output matrix, and calculates the reduction in government energy

demands which modifies the government final demand entries.

We were told for us to examine these calculations would impose an undue burden since the model was not programmed to allow ready access to these intermediate calculations. All we could observe were the input changes and the display of the results shown in Dr. Schinnar's testimony. No further calculations could be examined.

Q. Notwithstanding the lack of documentation concerning STARLOC and the inability to validate and test the model and its results, are you able to comment on any of the conclusions Dr. Schinnar has reached from his model?

A. Yes, several comments are appropriate. Let me preface this and the following answers, however, by saying that I do not believe that there is nearly enough documentation or validation of STARLOC for a decision maker to consider it as anything other than a preliminary draft version of a model.

Q. Based on the summary results that you have seen, do you have any concerns regarding the reasonableness of the STARLOC results?

A. Yes. Both the level and pattern of loss in job growth are counterintuitive. For example, the manufacturing sector is generally most sensitive to changes in local costs because manufacturing firms compete with firms outside of the region. Therefore, an economist would expect logically that the real increase in local electric rates would have the biggest percentage impact on manufacturing sector job growth. However, as shown in Figure 5 on page 19 of Dr. Schinnar's testimony, the manufacturing sector job growth loss is only 0.3 percent which is substantially less than the average projected reduction in job growth of 0.92 percent. In fact, the manufacturing sector is least affected of all the sectors by the electric rate rise. This result is counterintuitive and is not explained or supported in any of the

-7-

materials provided by Dr. Schinnar. Conversely, STARLOC projects that the largest percentage reduction in job growth would occur in the finance, insurance and real estate sector. This sector includes the following industries:

- Banks

- Savings and Loan Associations

- Stock and Commodity Brokers

- Stock Exchange

- Insurance Companies

- Insurance Agents and Brokers

- Real Estate Agents and Management Companies

These are not energy- or electricity-intensive industries. In fact, based on a review, in Dr. Schinnar's office, of the technical coefficients in the input-output matrix of STARLOC, electricity accounts for only 1.34 percent of total production costs in the finance, insurance and real estate sector (the shares of total cost due to electricity for all 23 STARLOC industries are shown in PECO Exhibit 25). The share of costs due to electricity are 2 percent or higher for several industries and are 6 percent or higher for 3 industries. An economist would expect that the greatest percentage change in job growth would occur in one of these other industries that had a much higher share of costs due to electricity.

Q. Are there other results which cause you concern?

A. Yes. The aggregate impact of the electricity price rise on job growth is much larger than one would expect even assuming the most unfavorable conditions. The real increase in electricity prices is 12.4 percent. The average share of electricity in total costs across all 23 STARLOC industries is 1.37 percent. The latter result is calculated as a weighted average of the shares of electricity for each of

STARLOC's 23 sectors as shown in PECO Exhibit 25 where the weights are 1981 output values as taken from Table 2.2 of the Technical Report on STARLOC PECO Exhibit 22.

The average direct increase in costs due to the electric rate increase is 0.17 percent. According to the STARLOC model's calculations, this will lead to a 0.92 percentage reduction in job growth. The estimated percentage reduction in job growth is 5.4 times the percentage increase in average production costs. A reduction of something close to a 0.17 percent in job growth would seem more plausible which, in terms of the number of jobs, would be 3,555 and not 19,196.

Q. Based on the documentation obtained, are there aspects of the STARLOC model's structure that concern you?

A. Yes. The main areas of concern are related to the price submodel of STARLOC which is outlined in Section IV of the Technical Report on STARLOC (PECO Exhibit 22). The procedure for translating a change in real electricity prices into an increase in the prices of output for the other 22 sectors of STARLOC is discussed on pages 3 through 5 of Section IV of the Technical Report. The final result is described in the equation labeled "(4.16)" on page 5. This equation indicates that an increase in electricity costs is passed on in terms of higher prices by the 22 sectors other than the electricity sector itself. In fact, this expression indicates that if production costs rise by 1 percent due to an increase in electricity prices, these will be passed through totally in the form of 1 percent higher industry output prices. Ultimately, the overall price increase would exceed one percent because of secondary effects.

Dr. Schinnar confirmed this during our meeting in his office on Monday, February 10, 1986, but he contradicted this during his oral testimony on Thursday, February 13, 1986. (Transcript p. 3376, line 18 - p. 3377, line 12). The algebra presented in the Technical Report (PECO Exhibit 22) indicates that electricity cost increases will be passed through totally in the form of higher output prices. If Dr. Schinnar's testimony is correct, then the documentation provided in his Technical Report (PECO Exhibit 22) is incorrect. If the Technical Report is correct, then Dr. Schinnar was confused about the operation of his own model during his cross examination.

Q. Assuming the Technical Report is correct, what is implied by the assumption that all increased costs are passed through in the form of higher prices?

A. Assuming that the Technical Report is correct, the implied assumption that all increased costs can be passed on in the form of higher prices is very questionable, particularly at the regional level. Local manufacturing firms competing in national markets may not be able to pass on any of the cost increase while competitive pressures may limit the pass through even for industries serving largely local markets. Dr. Schinnar acknowledged that industries will have difficulty passing on the entire cost increase during his cross examination. (Transcript, p. 3378, line 9 - p. 3379, line 16). In this same passage, however, he also asserts that his model does not pass these higher costs through entirely in the form of higher prices, which again contradicts his Technical Report.

Q. Do you have other areas of concern with the price submodel?

A. Yes. The other area of concern with the price submodel centers on the effect that higher output prices will have on demand for that output. Dr. Schinnar describes this process on pages 5 and 6 of Section IV of his Technical Report (PECO Exhibit

22) with the equations labeled "(4.18)" and "(4.19)" providing an algebraic description of the process. This text and the accompanying algebraic equations indicate that a 1 percent rise in the price of output will result in a 1 percent reduction in the intermediate and final (total) demand for real output. Dr. William W. Hogan, in PECO Statement No. 37, describes mathematically how this result is achieved.

Put slightly differently, if the price of a good were to double, then these equations in STARLOC indicate that the quantity demanded would be cut in half. Again, Dr. Schinnar agreed that this was how his model worked during our meeting on Monday, February 10, 1986. During his cross examination, Dr. Schinnar first reaffirms that a doubling of price would imply a halving of quantity (Transcript p. 3379, line 17 - p. 3380, line 21), but then he contradicts himself on page 3382, lines 7-17.

Again, the Technical Report clearly indicates that a 1 percent increase in prices results in a 1 percent reduction in demand, but Dr. Schinnar during his cross examination, first states that this is how his model works then says that it does not work that way. If his final answer in his cross examination is correct, then the Technical Report is incorrect.

Q.   Do you have any final concerns with the price submodel?

A.   A final concern relates to the impact of the electricity rate change is whether STARLOC doubly adjusts the energy components of final demand for the effects of energy price changes. Sections V and VI of the Technical Report (PECO Exhibit No. 22) indicate how the residential and government energy demand components of final demand would be adjusted in response to a change in electricity rates and how these changes would be entered into the final demand vector. What is unclear is whether,

1 or how, these components of final demand are then excluded from the general
2
3 adjustment for price changes as described on pages 5 and 6 of Section IV of the
4
5 Technical Report.
6
7 Q. Was the version of the STARLOC model that was used to evaluate the impacts of
8
9 the Limerick electric rate increase able to evaluate the total impact of Limerick
10
11 on the Philadelphia MSA economy?
12
13 A. No. Dr. Schinnar stated to me that this version of STARLOC could not assess the
14
15 positive contribution of Limerick construction on the economy, could not assess the
16
17 positive impact of property and other taxes paid by PECO for Limerick, could not
18
19 assess the continuing positive employment contribution due to Limerick operation,
20
21 and could not assess the positive impacts of purchases from local firms to support
22
23 construction and operation of Limerick. This version of STARLOC could only
24
25 assess the potential negative impacts of higher electric rates.
26
27 Q. You indicated you were able to review the inputs to STARLOC that were used to
28
29 calculate the employment impacts of higher electric rates. Were these impacts
30
31 correctly computed by Dr. Schinnar?
32
33 A. No. Dr. Schinnar incorrectly assumed that electricity prices in the entire
34
35 Philadelphia MSA would increase by the same percentage as PECO rates. PECO
36
37 only serves a portion of the MSA (none of New Jersey and not all of Bucks, Chester,
38
39 or Montgomery Counties in Pennsylvania). The effect of including in Dr. Schinnar's
40
41 model the portion of the MSA territory PECO does not serve, is to overstate the
42
43 dollar value of the electric utility sector output set forth in Table 2.2 to the
44
45 Technical Report (PECO Exhibit 22). Thus if you divide PECO's total 1981 electric
46
47 revenues ($2 billion) by the electric utility sector's 1981 total output ($2.5 billion),
48
49 the result indicates that PECO's portion of the total output in the Philadelphia MSA
50

is only 80%. Independent of the other problems with calculating the employment impacts, this error alone would result in overstating the employment impacts by at least 25 percent.

Q. Are there other aspects of the analysis which concern you?

A. Yes. Dr. Schinnar calculates the employment impacts on the Philadelphia MSA of a 28.2 percent increase in electricity prices over a three year period and estimates that job growth would be reduced by 19,196. He further indicates, on page 35 of his written testimony (City Exhibit No. 1), that the negative job growth impacts would lessen in the long-term to about a 14,000 loss in job growth.

This longer-term result cannot be supported by calculations with the STARLOC model because the alternatives considered by Dr. Schinnar to the PECO rate plan ultimately lead to higher (real and nominal) electricity prices within the PECO service area. For example, under the 5 year phase-in and 4 year phase-out plan described in Table 2, on page 11 of Dr. Schinnar's written testimony, electricity rates would be 55.0 percent above initial levels by the 9th year and above those in the PECO plan by the 7th year. However, under the PECO plan, electric rates would only by 37.5 percent above initial levels. Given these lower PECO electricity rates, the STARLOC model would project higher employment by the 7th year under the PECO plan than would be obtained under Dr. Schinnar's 5 year phase-in and 4 year phase-out plan.

Q. Would Dr. Schinnar agree with this conclusion?

A. In fact, Dr. Schinnar agreed in his oral testimony (Transcript p. 3400, line 3 - p. 3401, line 6) that the STARLOC model could produce higher job growth under the PECO plan where the rates under the alternative plans exceeded those under the PECO plan. Under Dr. Schinnar's supervision, we ran the STARLOC model to

determine its job growth response to alternative electricity prices.

Assuming a 5 percent inflation rate and zero GNP growth rate, the STARLOC model was run for different nominal electricity price increases. The relationship between the percentage change in electricity rates over three years and change in job growth is as follows:

Percentage Change in Electricity Rates	Change in Job Growth
28.2%	-19,196
25.0%	-14,396
20.0%	-6,708
15.0%	+1,228
10.0%	+9,433
0.0%	+26,756
-5.0%	+35,936

STARLOC clearly produces a larger job growth reduction for a higher electric rate change. Therefore, if STARLOC were used to compare the PECO plan to the alternative 5 year phase-in and 4 year phase-out plan, the model would show by the 7th year that the PECO plan would provide a relative job gain. To draw an analogy to a familiar television commercial, the choice presented between the PECO plan and the alternative 5 year phase-in, 4-year phase-out plan is similar to the choice between paying for an oil filter now versus paying for an engine repair later.

Q. Dr. Schink, you have not discussed Dr. Schinnar's growth model for the Philadelphia MSA. Does this model not play a role in calculating the job growth loss due to higher electricity rates?

A. No. The growth model, however, does indicate an obvious inconsistency within the STARLOC model's structure. It is apparent from the results obtained by Dr. Schinnar using his model that he believes that changes in electricity rates can have a substantial effect on job growth within the Philadelphia MSA.

-14-

When Dr. Schinnar developed the growth model component of STARLOC, however, he did not include electricity prices as a factor which influenced the rate of job growth within the Philadelphia MSA. As shown in Table 3.1 of Dr. Schinnar's Technical Report (PECO Exhibit 22), he apparently believes (or accepts) that job growth within the Philadelphia MSA (Gamma) is adequately explained by a combination of:

- Job growth in the U.S. (Delta);

- A time trend (T); and

- The ratio of the Philadelphia MSA average wages to U.S. average wages (W).

The above equation explains 90 percent of the historical variance in Philadelphia MSA job growth (i.e. $R^2=.90$).

The job growth equations shown in Table 3.1 produce predictions that appear to track historical employment growth accurately as illustrated in Figures 3.1 and 3.2 of the Technical Report. These equations do not contain the real price of electricity , which increased substantially after 1972. Therefore, if real electricity prices were not important enough to include in his growth model during the historical period, how can Dr. Schinnar be comfortable with the large impacts of changes in real electricity prices on job growth? The growth model results are inconsistent with Dr. Schinnar's estimates of the job growth impacts of the PECO rate proposal.

Q. Dr. Schink, does this complete your rebuttal testimony?

A. Yes it does.

GEORGE R. SCHINK
Vice President
Research and Development
Wharton Econometric Forecasting Associates
Philadelphia, PA 19104

PROFESSIONAL EXPERIENCE

WHARTON ECONOMETRIC FORECASTING ASSOCIATES, Philadelphia, PA

Vice President, Research and Development   6/83-Present

Responsible for the development, enhancement, specification, maintenance of the Wharton econometric models. Also responsible for design, execution, and economic content of large contract research projects, preparation and presentation of testimony, general quality control of Wharton economic analysis and forecasting products, internal training of economic staff, and design inputs for econometric and statistical software.

Key contract research projects include an analysis of the macroeconomic inpacts of local content legislation and an analysis of the economy-wide effects of the FCC access charge plan. Major model development projects include a redesign of Wharton's multiregion model of New York State and respecification and updating of Wharton's Quarterly Model.

Vice President, U.S. Modeling Services   1/80-6/83

Responsible for coordinating model development/enhancement activities of Wharton's U.S. forecasting services, including the Long-Term Forecasting Model, the Quarterly Forecasting Model, and Industry Planning Service Model.

Worked with the marketing group and the model project directors to develop new sources of revenue for the U.S. model-based forecasting services from both subscription and contract research sources.

Executive Director, Wharton Annual (Long-Term) Model Project   1/77-12/79

Responsible for directing model development/enhancement, forecasting, scenario analysis, contract research, forecast review meetings, and client support activities for U.S. Long-Term Forecasting Service.

Under the direction of Dr. Schink, the Wharton Annual Model was expanded in scope (from 850 variables to 2300 variables) to incorporate energy detail, demographic detail, and producer price detail. These changes were designed to enhance the Annual Model's usefulness for long-term planning and analysis. Research and development contracts to support the Long-Term Model enhancement activities were obtained from the Federal Energy Administration, the Electric Power Research Institute, the Office of Naval Research, Ross Laboratories, and the U.S. Department of Energy.

These model enhancement activities have led to contracts to perform long-term policy and scenario analyses for the groups supporting development as well as contracts from others such as the American Gas Association, the Whirlpool Corporation, the New York Stock Exchange, the General Accounting Office, the Joint Economic Committee, the U.S. Department of Commerce, Sun Oil Company, and the U.S. Department of Defense.

<u>Executive Director, Special Projects</u>   6/72-1/77

Directed the Commodity Model Maintenance Project (a joint effort with Charles
River Associates, Inc.). This project involved the development of econometric
models of the world markets for nonferrous mineral commodities. These models
were used to produce five-year projections of demand, supply, and price, and to
evaluate the effects of alternative General Services Administration commodity
disposal patterns on these commodity markets. Over a four-year period, twelve
markets were analyzed: Cobalt, Copper, Chromite, Lead, Manganese, Mercury,
Molybdenum, Platinum-Palladium, Rubber, Tin, Tungsten, and Zinc.

Developed a regional econometric model of Luzerne County, Pennsylvania, to
evaluate the effects of Hurricane Agnes on this area.

Developed a large model of the U.S. auto industry based on time-series and
cross-section data. This model, which was developed for the Transportation
Systems Center of the U.S. Department of Transportation, was designed as a tool
to investigate the longer-term determinants of the size and composition of the
U.S. auto fleet and to provide a tool for the analysis of various potential policy
initiatives.

Developed a model based on cross-section data for the National Association of
Broadcasters to analyze the effects of increasing the number of imported signals
carried via cable systems on the audience for local stations.

Participated in the development of Wharton's timesharing software system. Dr.
Schink was involved in the selection of a timesharing vendor, assembly of the
programming staff, specification of the software capabilities, the incorporation
of Wharton data bases and models in the new software system, the development
of documentation and the initial marketing effort.

Participated in the design of the Wharton World Model system.

UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA   Spring '73

Visiting Lecturer

THE BROOKINGS INSTITUTION, Washington, D.C.   6/69-6/72

<u>Resident Principal Investigator, Quarterly Model Project</u>

Responsible for directing the staff of the model project with guidance from
senior advisors (primarily Lawrence R. Klein and Gary Fromm).

Specified and estimated the version of the Brookings Model which was used to
perform analyses presented at the Conference on Research in Income and
Wealth, Harvard University, November 1969.

Constructed a condensed version of the Brookings Model to study the gains and
losses in simulation and forecasting accuracy associated with disaggregation of
econometric models.

Organized a major conference devoted to a review of econometric model building, the contributions of the Brookings Model project, and the perspective for future developments, held in Washington, D.C. during February 1972.

UNIVERSITY OF MARYLAND 9/68 – 6/72

Lecturer, Department of Economics
Taught full-time during the 1968-69 school year and part-time (one course per semester) thereafter.

Courses taught include microeconomic theory, macroeconomic theory, mathematics for economists, and econometrics at both the undergraduate and graduate levels.

MATHEMATICA, Princeton, N.J. 10/67-6/68

Consultant
Worked on the Northeast Corridor Project studying the determinants of travel between city-pairs.

UNIVERSITY OF PENNSYLVANIA, Philadelphia, PA 9/65-8/68

Research Fellow, Economic Research Unit
Worked for Lawrence R. Klein on the Wharton Quarterly Model Project. Under his direction, reestimated the entire model, developed computer software to solve the model, and mounted the model on a timesharing system.

Worked for Phoebus Dhrymes on several studies. Functioned as a programmer in implementing various distributed lag estimation techniques (search technique and spectral analysis technique) and estimated equations using three-stage least squares for a study of corporate investment, dividend, and borrowing policies.

Worked for Edwin Burmeister and F. Gerard Adams on several projects.

EDUCATION

Ph.D. in Economics, University of Pennsylvania, 1971

Thesis (Unpublished): Small Sample Estimates of the Variance Covariance Matrix of Forecast Error for Large Econometric Models: The Stochastic Simulation Technique. Won William Carey Price for best Ph.D. thesis in economics at the University of Pennsylvania, 1971.

Thesis Advisor: Professor Lawrence R. Klein

B.S. in Economics, University of Wisconsin at Madison, 1964

PROFESSIONAL HONORS AND ASSOCIATIONS

Board of Directors, Wharton Econometric Forecasting Associates, 1972-present.
William Carey Prize for Best Thesis in Economics, University of Pennsylvania.
Ford Foundation Dissertation Grant, 1967.
Research Fellowship, Economic Research Unit, University of Pennsylvania.
Member, American Economic Association and the Econometric Society.

PUBLISHED ARTICLES

"Short and Long Term Simulations with the Brookings Model" (with Gary Fromm and Lawrence R. Klein), in Bert G. Hickman (ed.) Econometric Models of Cyclical Behavior, New York: Bureau of Economic Research, 1972.

"Aggregation and Econometric Models" (with Gary Fromm), International Economic Review, February 1973.

"A Disaggregated Quarterly Model of U.S. Trade and Capital Flows: Simulations and Tests of Policy Effectiveness" (with Sung Y. Kwack), in Gary Fromm and Lawrence R. Klein (eds.), The Brookings Model: Perspective and Recent Developments, Amsterdam and New York: North-Holland Publishing Co. and American Elsevier Publishing Co., Inc., 1975.

"An Evaluation of the Predictive Abilities of a Large Model: Post-Sample Simulations With the Brookings Model," in Gary Fromm and Lawrence R. Klein (eds.), The Brookings Model: Perspective and Recent Developments, Amsterdam and New York: North-Holland Publishing Company and American Elsevier Publishing Company, Inc., 1975.

"The Brookings Quarterly Model: As An Aid to Longer Term Economic Policy Analysis," International Economic Review, February 1975. Reprinted in Lawrence R. Klein and Edwin Burmeister (eds.) Econometric Model Performance: Comparative Simulation Studies of the U.S. Economy, Philadelphia: University of Pennsylvania Press, 1976.

"An Overview of Econometric Model Building In And Of the U.S.A.: Subnational Macro Econometric Modeling," published in Proceedings of the NSF-CNRS Conference on Macroeconometric Models and Economic Forecasting, Universite de Paris, X-Naterre, November 22-26, 1976.

"The International Tin Agreement: A Reassessment" (with Gordon W. Smith), Economic Journal, December 1976, Reprinted in United Malaysia Bank Corporation Economic Review, Vol. 13, No.2, 1977.

"The Practice of Macroeconometric Model Building and Its Rationale," (with E.P. Howrey, L.R. Klein, and M.D. McCarthy), published in Large-Scale Macro-Econometric Models, Amsterdam, New York, and Oxford: North-Holland Publishing Company, 1981, pp.19-58.

RESEARCH REPORTS, CONFERENCE PRESENTATIONS AND TESTIMONY

"Estimation of Forecast Error in a Dynamic and/or Non-Linear Econometric Model," presented at the Econometric Society Meetings, Evanston, IL, December 1968.

"Simulation with Large Econometric Models," presented at the ACM Summer Meetings, Denver, CO, June 1970.

Nonferrous Mineral Commodity studies prepared for the Office of Stockpile Disposal of the General Services Administration (jointly with various staff members at Charles River Associates).

Forecasts and Analysis of the Molybdenum Market, 12/72
Forecasts and Analysis of the Mercury Market, 3/73
Forecasts and Analysis of the Lead Market, 6/73
Forecasts and Analysis of the Zinc Market, 7/73
Forecasts and Analysis of the Cobalt Market, 3/74
Forecasts and Analysis of the Tungsten Market, 6/74
Forecasts and Analysis of the Lead Market, 5/75
Forecasts and Analysis of the Tungsten Market, 9/75
Forecasts and Analysis of the Manganese Market, 10/75
Forecasts and Analysis of the Mercury Market, 11/75
Forecasts and Analysis of the Manganese Market, 11/76

An Econometric Model of Luzerne County, prepared for the Department of Commerce, Commonwealth of Pennsylvania, June 1974.

An Analysis of the Automobile Market: Modeling the Long-Run Determinants, 3 Volumes (with Colin Loxley), prepared for the U.S. Department of Transportation, Transportation Systems Center, Cambridge, MA, February 1977.

"Financing the Energy Program" (with Lawrence R. Klein and Richard M. Young), testimony before the Subcommittee on Administration of the Internal Revenue Code of the Committee on Finance, U.S. Senate, June 6, 1977.

"The Oil Equalization Tax" (with William Finan), testimony before the Committee on Energy and Natural Resources, U.S. Senate, September 16, 1977.

The Impacts of Cable TV on Local Station Audience (with Sheela Thanawala), prepared for the National Association of Broadcasters, 1771 N Street, N.W., Washington, D.C. 20036, March 1978.

Analysis of the Macroeconomic Impacts of the Proposed NHTSA Passenger Car MPG Standards, prepared for the Chase Manhattan Bank, N.A., 1 Chase Manhattan Plaza, New York, N.Y. 10015, January 1979.

"U.S. Economic Prospects for the Next Ten Years," The Wharton Magazine, Winter 1979.

Simulation Study of Eight Petroleum Supply Disruption Scenarios, prepared for the Macroeconomic Analysis Division of the Energy Information Administration, U.S. Department of Energy, April 1979.

"Input-Output in the Context of the Wharton Annual Model "(with Gene D. Guill and Yacov Sheinin), Wharton Annual Model Working Paper Number 6, April 1978. Presented at the Seventh International Conference on Input-Output Techniques, Innsbruck, Austria, April 1979.

"Optimal Control and Macroeconomic Models," a paper prepared as part of a study entitled Mexico--Economic Policy Analysis--1978/1983: A Macroeconometric Model of Mexico and Control Theory Applications, by Oscar Adolfo Rufatt, under a grant from the Inter-American Development Bank, May 1979.

"Integration of Neoclassical Production Function Theory and Input-Output Matrices" (with Gene D. Guill and Yacov Sheinin), presented at a Seminar on Production Functions at the U.S. Department of Energy, May 21, 1979.

The Wharton Annual Energy Model: Development and Simulation Results (with William Finan), prepared for the Electric Power Research Institute, 3412 Hillview Avenue, Palo Alto, California 93404, EPRI EA-1115, Project 440-1, July 1979.

A Historical Analysis of the Impacts of Indexed Depreciation (with Sheila Bassett and Yacov Sheinin), prepared for the Sun Company, Inc., Radnor, PA, October 1979.

"A Macroeconomic Analysis of the Carter Energy Plan," presented at the Conference on Energy Prices, Inflation, and Economic Activity, Massachusetts Institute of Technology, Cambridge, MA, November 9, 1979.

The Macroeconomic Effects of Oil Supply Curtailments in 1985 and 1990 (with William Finan), prepared for the U.S. Department of Energy, December 1979.

A Macroeconometric Model to Allow Energy Policy Analysis of Changing Fuel Specific Prices on Production Capabilities (with Gene D. Guill and Yacov Sheinin), prepared for the Macroeconomic Analysis Division of the Energy Information Administration, U.S. Department of Energy, April 1980.

The Development of an Analytical Procedure for the Evaluation of the Effect on Energy Price Increases on Non-energy Commodities (with Gene D. Guill and Yacov Sheinin), prepared for the Macroeconomic Analysis Division of the Energy Information Administration, U.S. Department of Energy, April 1980.

Impact of Local Content Legislation On U.S. and World Economies, (with Colin Loxley), prepared for the Japan Automobile Manufacturers Association, Inc., July 1983.

A Macroeconomic Analysis Of a Program For the Redevelopment of Troubled U.S. Industries, prepared for The Sun Company, 100 Matsonford Road, Radnor, PA 19087, October 1983.

Impact of the FCC Access Charge Plan On the U.S. Economy, (with Vijaya G. Duggal and John Green), prepared for the American Telephone & Telegraph, November 1983.

Brief Macroeconomic Analysis of S.1435: The Housing Opportunity and Mortgage Equity Act of 1983 (Home Act), prepared for the National Association of Home Builders of the United States, 15th and M. Streets, NW, Washington, DC, 20005, December 1983

Testimony on Electric Power Demand in the PECO Service Area before the Pennsylvania Public Utility Commission, January 1985.

Rebuttal Testimony on Projections of Electric Power Demand in the PECO Service Area, Pennsylvania Public Utility Commission, April 1985.

Testimony on the issue of the Economic Impact of the Gibbons Bill on the United States Economy before the Subcommittee on Trade of the Committee on Ways and Means, Washington, D.C., June 1985.

Testimony on The Economic Impacts of Implementing the Tax Reform Act of 1985 (H.R. 3838) before the Senate Committee on Finance, Washington, D.C., January 1986.

PENNSYLVANIA PUBLIC UTILITY COMMISSION
V.
PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

SUR-SURREBUTTAL TESTIMONY

OF

GEORGE R. SCHINK

CRITIQUE OF THE SURREBUTTAL TESTIMONY
OF DR. ARIE SCHINNAR

MARCH 7, 1986

SUR-SURREBUTTAL TESTIMONY OF DR. GEORGE R. SCHINK

Q. Please state your full name, title and business address for the record.

A. George R. Schink, Ph.D. My business address is Wharton Econometric Forecasting Associates, Inc., 3624 Science Center, Philadelphia, Pennsylvania 19104.

Q. By whom are you employed, and in what capacity?

A. I am Vice President for Research and Development at Wharton Econometric Forecasting Associates, Inc. (WEFA). I am responsible for the development, enhancement, specification, and maintenance of the WEFA econometric models.

Q. Have you previously filed testimony in this proceeding?

A. Yes. I have previously filed rebuttal testimony regarding the direct testimony of Dr. Arie Schinnar and his STARLOC model. This rebuttal testimony is marked PECO Statement No. 38.

Q. What is the purpose of your sur-surrebuttal testimony?

A. My purpose is to comment on the surrebuttal testimony of Dr. Arie Schinnar as it relates to my previous testimony and to the relationship of my previous testimony to the rebuttal testimony of Dr. William Hogan (PECO Statement No. 37) and to the rebuttal testimony of Dr. Frank Clemente (PECO Statement No. 36).

Q. Please summarize the key points of your sur-surrebuttal testimony?

A. The key points are:

- My purpose for suggesting a plausible number (3,555) for the potential loss in job growth due to PECO's proposed electric rate increase was not to provide a specific alternative estimate to Dr. Schinnar's estimate, but to illustrate the implausible nature of Dr. Schinnar's estimate, which is at least five times larger than would be reasonable under the circumstances.

- I accounted for all of the direct, indirect, and multiplier effects of the proposed electric rate increase when I developed my plausible potential value for the loss in job growth. Contrary to Dr. Schinnar's assertion, I did not consider just one component of job growth change.

- Dr. Schinnar's excessive estimate of the loss in job growth due to PECO's proposed electric rate increase is the result of an inherent design flaw in the STARLOC model. This design flaw magnifies small initial changes in demand into large changes in employment and accounts for most of Dr. Schinnar's 5-fold overestimate of job growth loss.

- Despite his claim to me that modifying the STARLOC model software to produce intermediate calculations imposed an undue burden, Dr. Schinnar clearly has modified his model's software to produce selected intermediate calculations ostensibly to support the arguments in his surrebuttal testimony.

- The STARLOC model produces absurd estimates of the changes in employment growth due to energy conservation and interfuel substitution. Dr. Schinnar's calculations imply that PECO would reduce its workforce by 38 percent while, realistically, the PECO work force reduction should be less than 2 percent.

- Dr. Schinnar not only grossly overstates the direct job growth loss due to conservation and interfuel substitution, he adjusts demand and employment downward twice for these same effects.

- These clearly excessive and duplicate estimates of potential job growth loss make it imperative that all of the intermediate and final calculations of the STARLOC model be subjected to public scrutiny before the model's results can be used as an input to the policy making process.

- Dr. Schinnar has not provided anything like sufficient information to fully evaluate the STARLOC model to the degree necessary for its results to be given creedence by a policy maker.

- On March 5, 1986, Dr. Schinnar provided "supplemental" responses to requests for data, indicating for the first time that he did have workpapers after all and that he could produce intermediate calculations in approximately 3 weeks. Both of these responses were contrary to Dr. Schinnar's prior representations.

- Finally, Dr. Schinnar claims that Dr. Hogan and I contradict Dr. Clemente's position that electric rates are not a critical factor in determining regional growth potential. In fact, Dr. Hogan and I conclude that the potential negative impacts of PECO's proposed electric rate increase on employment growth are very small, thereby contradicting Dr. Schinnar and not Dr. Clemente.

Q. Did you, as Dr. Schinnar asserts on page 3 of his surrebuttal testimony, estimate that the proposed PECO rate increase would lead in fact to a loss of growth of 3,555 new jobs?

A. No. I suggested this number as a plausible potential outcome in contrast to Dr. Schinnar's excessive and implausible estimate of a loss of growth of 19,196 new jobs.

Q. Did you use a formal mathematical model to reach your result?

A. No. My result is based on my experience with the sensitivity of regional employment to changes in the relative local cost-of-doing-business. The PECO rate increase would raise the average relative local cost-of-doing-business by only 0.17 percent as explained in my rebuttal testimony (PECO Statement No. 38, p.8, l. 41- p.9, l. 17). Based on my experience, a 0.17 percent increase in the relative local cost-of-doing-business could lead to a potential total loss in job growth of only

approximately 0.17 percent. An 0.17 percent reduction in job growth translates into 3,555 jobs, assuming the employment levels shown in Table 2.2 of the draft Technical Report on the STARLOC model (PECO Exhibit 22).

Q. Dr. Schinnar asserts that your 3,555 figure accounts for only part of the total loss in job growth. Do you agree?

A. No. Dr. Schinnar claims that my 3,555 figure is comparable to his calculation of the "direct impact" of the PECO rate increase as shown in Calculation 2 of Table 1 of his surrebuttal testimony (City Statement No. 1A, p.5). This is not correct. A 3,555 loss in job growth would be plausible only after all of the factors enumerated in Table 1 are taken into account.

Q. Could you provide an illustration of how such a result could be obtained?

A. Yes. In my Table 1, I have calculated a plausible value for the total job growth loss based on certain data provided by Dr. Schinnar and based on plausible assumptions for the sensitivity of local job growth to changes in the relative local cost-of-doing-business. Adopting Dr. Schinnar's starting point, employment levels for 1981 are taken as the baseline values for the calculation. Utilizing Dr. Schinnar's estimates of the share of electricity in total cost for the manufacturing and nonmanufacturing sectors, the 12.4 percent increase in real electric rates would cause the total real cost-of-doing-business to rise by 0.14 percent for manufacturing and by 0.24 percent for nonmanufacturing.

Table 1: Plausible Job Growth Loss Calculation (28.2% Nominal Rate Increase, 5 Percent Annual Inflation, 12.4% Real Rate Increase)

Line No.	Description	Manufacturing Sector	Nonmanufacturing Sector
1.	1981 Base case Employment[1]	461,807	1,614,280
2.	Electricity as share of Total Costs[2]	1.15%	1.94%
3.	Increase in Total Cost-of-Doing-Business Due to Real Rate Increase	0.1426%	0.2406%
4.	Plausible Elasticities of Employment with Respect to Cost-of-Doing-Business	-0.9	-0.4
5.	Potential Direct Loss in Employment Due to Cost-of-Doing-Business	443	1,555
6.	Potential Total Effect on Employment Including Multiplier Effects (1.65 times line 5)[3]	731	2,566

Notes:

[1] Taken from Table 2.2 of the draft Technical Report on the STARLOC model (PECO Exhibit 22).

[2] Taken from Appendix to Surrebuttal Testimony of Dr. Schinnar (City Statement No. 1A).

[3] Taken from page 10 of Surrebuttal Testimony of Dr. Schinnar (City Statement No. 1A).

As I indicated in my rebuttal testimony (PECO Statement No. 38, p.7, l. 31, p.8, l. 37), the manufacturing sectors should be more sensitive to an increase in the cost-of-doing-business (total costs) than would be the nonmanufacturing sectors. In my Table 1, manufacturing employment is postulated to decline by 0.9 percent for every 1.0 percent rise in total costs, while nonmanufacturing sector employment is postulated to decline by 0.4 percent for every 1.0 percent rise in total costs. These sensitivities (elasticities) combined with the increases in total costs due to the real rate increase would imply a potential job growth loss of 443 (or 0.096 percent) for manufacturing and a potential job growth loss of 1,555 (or 0.096 percent) for nonmanufacturing.

Dr. Schinnar estimates that the employment multiplier is 1.65, meaning that the indirect loss in job growth would be 65 percent of the direct loss. The last line in my Table 1 shows the potential total loss in job growth for the manufacturing and nonmanufacturing sectors, including the job multiplier effects. The potential total job loss growth in these two sectors is 3,297. This figure is consistent with my judgement that a total potential job growth loss of 3,555 would be a plausible result while the 19,196 job growth loss estimated by Dr. Schinnar simply is not plausible.

Q. Do you understand how the STARLOC model might produce such an implausibly large estimate of the loss in job growth due to the PECO's proposed rate increase?

A. Yes. As I indicated in my rebuttal testimony (PECO Statement No. 38, p.9, l. 23 -12, l. 5), my main area of concern with the STARLOC model is related to the price submodel as described in Section IV of the draft Technical Report (PECO Exhibit 22). To illustrate why the structure of the STARLOC model produces such a large estimate of the loss in job growth, I will specify a highly simplified representation of the STARLOC model.

The STARLOC model equates local output to demand for that output. Demand, in turn, can be decomposed into demand that is sensitive to changes in local income and output and demand that is not sensitive to these local changes. The former is represented by local consumer spending while the latter is represented by export sales outside the region. Consider the following simplified representation of the STARLOC model:

$$X = D_L + D_F \qquad \text{(Equation 1)}$$

$$D_L = 0.8 X \qquad \text{(Equation 2)}$$

$$E = X \qquad \text{(Equation 3)}$$

where

$X =$ total local output and income

$D_L =$ local (output and income sensitive) demand

$D_F =$ foreign (not output or income sensitive) demand

$E =$ employment

Equation-2 indicates that local demand (D_L) equals 80 percent of local income (X). The remaining local income is either saved or spent on goods produced elsewhere (i.e., imports into the region). The 80 percent value is approximately equal to the percent of local income devoted to local output in the STARLOC model. Equation 3 indicates that employment changes in proportion to output (i.e., a 1 percent drop in output leads to a 1 percent drop in employment). To solve the above system of equations, we must assume a value for foreign demand (D_F). If D_F

is 20, then output (X) would be 100, local demand (D_L) would be 80, and employment (E) would be 100.

When one introduces a real increase in electric rates of 12.4 percent, the STARLOC model calculates an average induced price increase of 0.2 percent for the sectors of the economy other than electric utilities (see Rebuttal Testimony of William Hogan, PECO Statement No. 37, p.10, l. 21, p.11, l. 11). Paralleling the methodology shown in Section IV, pages 5 and 6 of the draft Technical Report (PECO Exhibit 22), Dr. Schinnar would alter the first equation in the above simple model to reflect this 0.2 percent rise as follows:

$$X = \quad 0.998 \, (D_L + D_F) \qquad\qquad\qquad \text{(Equation 1A)}$$

Assuming foreign demand (D_F) remains equal to 20, output (X) would now equal 99, local demand (D_L) would equal 79.2, and employment (E) would equal 99. Therefore, an 0.2 percent increase in local prices produces a 0.2 percent decline in demand, which leads to a 1.0 percent drop in local output and employment. Thus the STARLOC model inflates a small decrease in demand into a huge decline in employment. This decline in employment is too large by a factor of five.

These unrealistic results of my simple model are essentially consistent with those produced by the STARLOC model because STARLOC translates an 0.214 percent increase in prices into an 0.92 percent decline in employment.

Q. What is responsible for these unrealistic results?

A. The key problem is a design flaw in the STARLOC model whereby the foreign demand (D_F) is insensitive to changes in local output and income (X), and whereby local demand (D_L) is only 80 percent of local output and income. The STARLOC

model is thus inherently and excessively sensitive to any changes in demand induced by price changes whether electric or otherwise or by any other induced change in demand.

Q. You have referred to Table 1 presented in Dr. Schinnar's surrebuttal testimony (City Statement No. 1A, p.5). What does this table contain?

A. This table contains certain selected intermediate results from the STARLOC model. These results purport to present the aggregate employment impacts attributable to four causes: (1) "energy conservation and interfuel substitution," (2) "PECO's direct impact on cost-of-doing business," (3) "secondary inflation economywide", and (4) "employment multiplier."

Q. Have you seen these intermediate results before?

A. No. These intermediate results were presented for the first time in Dr. Schinnar's surrebuttal testimony. They did not appear in either Dr. Schinnar's direct testimony or the draft Technical Report (PECO Exhibit 22). These intermediate results, moreover, were not made available to me or any of the other PECO experts during our meetings with Dr. Schinnar on February 10-12, 1986. These intermediate results were not accessible to us on Dr. Schinnar's computer when we were making computer runs at Dr. Schinnar's workshop.

Q. Are these particular intermediate results now accessible on Dr. Schinnar's computer?

A. Yes. The computer runs that generated these calculations are shown in an attachment provided by Dr. Schinnar entitled, "Computer Printouts and Worksheets." It is clear from these printouts that Dr. Schinnar has modified the computer program used to solve the STARLOC model since the time of our visit to enable him to produce these results. Presumably he modified his computer program subsequent to his cross-examination on February 13, 1986.

-9-

Q. Had you previously asked Dr. Schinnar to produce any intermediate calculations?

A. Yes. We asked Dr. Schinnar to produce the results of all of the intermediate calculations of the STARLOC model. Moreover, we specifically asked him to produce the results of particular intermediate calculations such as the calculation that solves equation (3.31) on page 8 of the draft Technical Report (PECO Exhibit 22), and the results that show the effect of the proposed PECO electric rate increase on Tables 2.2, 2.3, 2.4, 2.5, and 2.6 of the draft Technical Report. Dr. Schinnar declined to produce any intermediate results because he stated that to do so would constitute "an undue burden."

Q. Are the intermediate results contained in Table 1 of Dr. Schinnar's surrebuttal testimony the results of all of the intermediate calculations of the STARLOC model?

A. Certainly not. Dr. Schinnar stated in his direct testimony that the STARLOC model "includes nearly two hundred equations and over one thousand parameters" (City Statement No.1, p.4). Of the thousands of calculations required to solve (and validate) the STARLOC model, Dr. Schinnar has as of this date printed the results of only four. The intermediate results appearing in Table 1 are nothing more than intermediate results selected solely and ostensibly to support the arguments appearing in Dr. Schinnar's surrebuttal testimony.

Q. What do the intermediate results shown in Table 1 of Dr. Schinnar's surrebuttal testimony disclose?

A. These results disclose that the STARLOC model produces absurd estimates of the changes in employment growth due to energy conservation and interfuel substitution. They also disclose that the STARLOC model adjusts demand and employment downward twice to account for these same effects. It seems the more

-10-

one learns about the inner workings of the STARLOC model, the more problems that are revealed. The significant problems revealed thus far from our limited glimpse of the model's inner workings makes it imperative that Dr. Schinnar display all of the intermediate results he produced before the model can be relied upon for policy-making purposes.

Q. What do the results in Table 1 reveal about the employment impacts from energy conservation and interfuel substitution due to PECO's proposed rate increase?

A. The results in Dr. Schinnar's table illustrate that the estimated loss in job growth from energy conservation and interfuel substitution is absurd. Dr. Schinnar estimates that the direct loss in employment growth due to energy conservation and interfuel substitution is 3,142 jobs. This loss in potential job growth must principally come from PECO's direct employment. As of 1981, PECO's total employment in its electricity operation (as opposed to its natural gas or steam operations) was 8,264. Historical data on PECO's employment within its electrical division is shown in Exhibit GRS-2. A job growth loss of 3,142 is 38.0 percent of the total PECO electricity related workforce! Such a result is clearly absurd.

Q. Could you explain why the direct job growth loss due to energy conservation and interfuel substitution must come principally from PECO's direct employment?

A. Yes. To do this, we must first examine the effects of higher electric rates on energy useage. Given that Dr. Schinnar is estimating the changes in total energy usage and specific fuel use due to a 12.4 percent rise in real electricity prices, the nature of the changes is clear. Specifically, Dr. Schinnar is estimating that electricity consumption will decline while the usage of competing fuels, such as natural gas, petroleum products, and coal will increase. Also, total energy consumption will decline.

Therefore, the direct effects of energy conservation and interfuel substitution would be to reduce final and intermediate demand for electricity and to increase the demand (final and intermediate) for natural gas, petroleum products, and coal. Although these changes in demand would produce a reduction in employment growth for electric utilities, such changes would produce increases in employment growth for gas utilities, petroleum refineries, petroleum distributors, and coal distributors. The major direct suppliers to electric utilities also would face reduced demand, but many of these inputs come from outside the region. Reductions in inputs of coal and petroleum products used to generate electricity would offset some of the direct gains in demand that the coal and petroleum sectors would experience.

Q. Do the results provided by Dr. Schinnar show that the loss in job growth from conservation and interfuel substitution is concentrated in the electric utility sector?

A. No. The direct impacts on electric utility sector employment are not isolated in either Dr. Schinnar's surrebuttal testimony (City Statement No. 1A) or in his "Computer Printouts and Worksheets." His estimate of the direct impacts involves hand calculation from the materials provided. The results provided in the "Computer Printouts and Worksheets" include direct, indirect, and induced effects of energy conservation and interfuel substitution and do not specifically show the change in employment growth in the electric utility sector. Instead, the total employment growth change for the transportation, communications, electric utility, and gas utility sectors are combined into a single value.

The results shown in Dr. Schinnar's computer printouts are disturbing, however, because the distribution of job growth changes ultimately resulting from energy

-12-

conservation and interfuel substitution is extremely peculiar. These results are as

follows:

Aggregations of Individual STARLOC Model Sectors	Change in Job Growth Due to Direct, Indirect, and Induced Effects[*]
Manufacturing	-331
Government	-1022
Services	-1958
Finance, Insurance, Real Estate	-756
Transportation, Communications, Utilities	991
Wholesale & Retail Trade	-1679
Construction, Agriculture & Mining	-430
Sum of the Above Sectors	-5184

(The sum is taken from Dr. Schinnar's computer printouts and is not exactly equal

to the sum of the sector changes due to rounding).

The transportation, communications, and utility sector shows a net <u>gain</u> in job

growth while all of the other sectors show job losses. Given that the direct job

losses must be concentrated in the electric utility sector, this result is very

strange.

Q. Since you have shown Dr. Schinnar's estimate of 3,142 direct loss in job growth due

to energy conservation and interfuel substitution to be absurd, can your provide an

indication of what a reasonable estimate would be?

A. Yes. In Appendix A to my sur-surrebuttal testimony I set forth the calculations

which indicate that a potential drop in PECO's employment growth would be

approximately 132 jobs as opposed to the 3,142 suggested by Dr. Schinnar.

Q. Do the new calculations presented in Table 1 of Dr. Schinnar's surrebuttal

testimony indicate any other problems with Dr. Schinnar's estimates?

_____

[*] Figures are taken from Dr. Schinnar's "Computer Printouts
and Worksheets".

A. Yes. It appears that Dr. Schinnar adjusts demand twice for the impacts of higher electric rates. In his Table 1, Dr. Schinnar shows separate direct impacts for energy conservation and interfuel substitution (Step 1) and for higher prices for PECO's output (Step 2). Final and intermediate demand for electricity and other fuels is presumably changed to reflect higher electric rates during Step 1.

Dr. Schinnar then adjusts final and intermediate demands again to reflect the effects of higher electricity rates in Step 2. While I believe the value calculated in either Step 1 or Step 2 should be much smaller (somewhere between 132 and 438 rather than in excess of 3,000), this adjustment to job growth should only be made once. Dr. Schinnar adjusts job growth twice for the direct effects of higher electric rates.

Q. Do you believe that you now have sufficient information to fully evaluate the STARLOC model?

A. No. Even with the new information provided in Dr. Schinnar's surrebuttal testimony, the documentation of the STARLOC model is severely lacking. To be able to evaluate fully the STARLOC model, we would need to be able to examine all of the model calculations (final and intermediate) and would need to be able to run the model under a wide range of alternative assumptions.

Dr. Schinnar asserted in his surrebuttal testimony (City Statement No. 1A, pp. 13-14) that he has provided us with sufficient information and ample access to the computer code. He has not. The only available written model documentation is contained in the draft Technical Report in (PECO Exhibit 22). That document is in draft form and is incomplete in that it refers to still unwritten documentation for complete and detailed descriptions of key STARLOC elements. For example, pages 3 and 4 of Section I, page 4 of Section II, page 4 of Section III, page 2 of Section V,

page 4 of Section V, page 4 of Section VI, page 9 of Section VI, and page 1 of Section VII of PECO Exhibit 22 all refer to currently unavailable STARLOC documentation.

Although Dr. Schinnar did spend time with us answering questions, he was not made available to us until the three days before his cross-examination, and just the week before our testimony was due. We could have learned much more from complete and detailed written documentation, including all intermediate calculations, which is essential to any validation process.

Also, the model code is written in APL language. We requested that Dr. Schinnar allow our APL programmers to mount the model on our computer account so that we could test the model completely and could learn specifically how the model operated from the computer code. Dr. Schinnar would not permit our APL programmers to have access to the computer code.

Dr. Schinnar did let me look at a printed listing of the STARLOC computer code. As I told him, however, I am not an APL programmer and could not learn much from my access to the code. I studied the printout for two hours to determine the relative importance of electricity in total costs by industry. These data are shown in PECO Exhibit 25. The printout I was given contained no documentation, so it took a long time to gather even this limited amount of information.

Although Dr. Schinnar allowed us to observe STARLOC running on the computer, we could change only a subset of inputs and could observe only a small subset of the output. The "sensitivity runs" which could be performed were severely constrained. We were restricted simply to changing the same input parameters again and again, and could not test the sensitivity of any intermediate

calculations. Dr. Schinnar had determined the content of both the input and output

subsets when he programmed the computer. We were told it was "an undue" burden

to be able to look at intermediate calculations, yet Dr. Schinnar later produced

some intermediate calculations ostensibly to support his arguments in his

surrebuttal testimony (see Table 1 City Statement No. 1A, p.5).

Q. Has Dr. Schinnar offered to provide any additional information?

A. Yes, but this information was offered at too late a date to permit meaningful

analysis or even to be reviewed prior to completing this testimony. Dr. Schinnar

"supplemented" this earlier responses to a PECO interrogatory served in December,

1985 seeking his workpapers and our oral request for all intermediate calculations

(made on February 10-12, 1986) on March 5, 1986 by stating that the "Staff of the

Wharton Policy Modeling Workshop has assembled Supplemental Staff notes used in

developing the STARLOC Model." Supplemental Response to IR-PECO-City-1-7(b)

is attached hereto as Exhibit GRS-4. However, he also stated that these "notes are

voluminous and, therefore, are being made available for review at the Wharton

Policy Modeling Workshop, University of Pennsylvania."

I called Dr. Schinnar on the morning of March 6, 1986 to arrange to see this

material. Dr. Schinnar indicated that in fact it was not actually ready for me to

see at that time, and that he still had to finish organizing the material before I

could see it. Dr. Schinnar asked me to wait until Monday, March 10, 1986 to see

these materials. I told Dr. Schinnar that I needed to complete my testimony in

time to be submitted on Friday, March 7, 1986.

Dr. Schinnar said that he was going to leave the office and could not possibly let me

see any materials on Thursday, March 6, 1986. I asked to see the materials as soon

as possible, and he said that I could see them on Friday, March 7, 1986.

1
2 Unfortunately, to allow time for reproduction and distribution this testimony had to
3 be completed before I could meet with Dr. Schinnar.
4
5 Q. Prior to receiving Dr. Schinnar's "supplemental" responses (Exhibit GRS-4), had Dr.
6
7 Schinnar ever informed PECO as to whether STARLOC's intermediate calculations
8
9 could be made available for review in time to be utilized in this proceeding?
10
11 A. Yes. During our interview of Dr. Schinnar on February 12, 1986, he stated that in
12
13 order for the intermediate calculations to be accessible, he would have to transfer
14
15 the STARLOC model to a larger, mainframe computer and set-up files for these
16
17 calculations in the computer. He stated that if he had his graduate assistants
18
19 available to help in the process it would take at least 4 to 6 weeks before any
20
21 intermediate calculations could be obtained. He went on to state, however, that his
22
23 graduate assistants were not available for this project so, as a practical matter, it
24
25 was not possible for him to provide the intermediate calculations at all.
26
27 It was not until his "supplemental" response that Dr. Schinnar for the first
28
29 time indicated these intermediate calculations could be made available in
30
31 approximately three weeks. At this point in the proceeding, however, the effect is
32
33 the same: namely, the STARLOC model cannot be reviewed, tested and validated
34
35 before the close of the record in this proceeding.
36
37 Q. In his Appendix to his surrebuttal testimony, Dr. Schinnar lists a number of factors
38
39 in an attempt to explain the apparently counterintuitive behavior of the STARLOC
40
41 model. Do you agree with this explanation?
42
43 A. No. These factors neither individually nor collectively explain the counterintuitive
44
45 nature of his results. As I explained in my rebuttal testimony (PECO Statement No.
46
47 38) the manufacturing industries operating in the Philadelphia area principally face
48
49 competition from outside of the region while local service industries face very
50

-17-

little, if any, competition from outside of the region. Competition from outside the region should produce the greatest direct effects on output and employment. Therefore, output and employment in the manufacturing sector intuitively should be much more sensitive to changes in costs than output and employment in the service industries, regardless of the indirect effects listed in Dr. Schinnar's Appendix.

Q. Dr. Schinnar indicates that you and Dr. Hogan (PECO Statement No. 37) were estimating different components of the change in job growth due to higher electric rates and, therefore, that your two estimates should be added together. Do you agree?

A. No. Dr. Hogan replicated the calculations presented in the draft Technical Report (PECO Exhibit 22) on page 5 of Section IV (see equation 4.16). Based on the implied small increases in prices that he computed for the output of goods produced within the region (see Exhibit WWH-2 of PECO Statement No. 37), Dr. Hogan found the almost 1 percent reduction in local job growth to be implausible and concluded that he could "think of no economic mechanism that would produce this surprising result" (see page 11, lines 9-11 of PECO Statement No. 37). Dr. Hogan went on to suggest that a plausible range for the job growth loss would be between zero and 2,000 to 3,000 jobs, and not the 19,196 estimated by Dr. Schinnar.

As I have stated above, I reached an essentially identical conclusion as to the plausible possible size of the loss in job growth. I reached my conclusions using a different approach than Dr. Hogan, but nonetheless, as illustrated earlier in this testimony, I accounted for all relevant factors, as did Dr. Hogan.

Q. Dr. Schinnar states on page 3 of his surrebuttal testimony that Dr. Clemente and the other PECO experts, presumably referring to you and Dr. Hogan, disagree as to the direction of the impact of higher electric rates in the Philadelphia area

economy. Do you agree?

A. No. Neither Dr. Clemente, Dr. Hogan, nor I contend that higher electric rates would have a positive effect on the Philadelphia area economy. We agree that whatever negative impact would occur, if any, would be much smaller than Dr. Schinnar estimates. Dr. Clemente makes this point clearly (PECO Statement No. 36, p.4, l. 35 - p.5, l. 5) when he argues that electricity rates are only one of many factors influencing growth in a local economy and certainly are not the most important factor. Indeed, Dr. Schinnar implicitly supports a similar conclusion. Dr. Schinnar's growth submodel described in Table 3-1 of the draft Technical Report (PECO Exhibit 22), developed for the Philadelphia area, does not include electric rates as a factor influencing overall employment growth. Instead, the growth submodel recognizes the primacy of factors such as U.S. employment growth and relative wage rates. Therefore, Dr. Schinnar recognizes that electric rate increases play a sufficiently minor role in the growth of an economy that he did not include it as a variable in his growth submodel.

Q. Dr. Schink, does this conclude your sur-surrebuttal testimony?

A. Yes it does.

-19-

Procedure Used to Develop An Estimate of Employment
Change Due To Conservation and Interfuel Substitution

To develop such an estimate of employment changes, one must first determine the likely reduction in PECO's electricity sales (in billions of Kwh) due to higher electric rates and then the likely reduction in PECO's employment growth due to this reduction in Kwh sales.

Although Dr. Schinnar does not provide a specific estimate of PECO's loss in kilowatt hour sales due to higher real electric rates, he does show the average own price elasticity estimates for electricity used in STARLOC (City Statement No. 1, page 28). Table A summarizes these data and provides an average estimate for the elasticities.

Based on discussions of the distinction between long-run and short-run results in Dr. Schinnar's direct testimony (City Statement No. 1, page 35), I suspect that Dr. Schinnar used the short-run elasticities shown in my Table A to calculate Table 1 of his surrebuttal testimony (City Statement No. 1A, page 5). These short-run elasticities imply a 3.8 percent decline in Kwh sales for a 12.4 percent increase in electric rates.

To translate the reduction in Kwh sales into a reduction in PECO employment growth, we must estimate the relationship between Kwh sales and PECO employment. The PECO Kwh sales and employment data from 1976 through 1984 are shown in Exhibit GRS-2. The results obtained from a regression of PECO's electricity division employment (EMP) on PECO's Kwh sales (Kwh) are shown in Exhibit GRS-3. The time trend term (TIME) has a negative coefficient indicating productivity gains over time (more Kwh per employee). The two shift variables (DUM82 and DUM83.84) were introduced to capture the buildup in employment in anticipation of Limerick Unit No. 1

going into operation. This equation explains 97.5 percent of the variance in PECO's employment over the 1976 through 1984 period.

Based on the regression relating PECO's electricity division employment to Kwh sales over the 1976 to 1984 period, the 3.8 percent decline in Kwh sales would lead to a potential 1.6 percent drop in PECO's employment growth which is only 132 jobs (not 3,142). Even if Dr. Schinnar used the long-run elasticities, the potential PECO job growth loss would be only 438.

Table A: Sensitivity of PECO's Kwh Sales to Changes in Real Electric Rates

Sector	Percent of Total PECO Kwh Sales (1981)	Own Price Elasticities for Real Electric Prices	
		Short-Run	Long-Run
Manufacturing	29%	-.39	-1.08
Nonmanufacturing	40%	-.25	-1.16
Residential	31%	-.31	-0.73
Weighted Average	---	-.31	-1.00
Percent Change in Kwh Sales Due to a 12.4% Real Rate Increase		-3.8%	-12.4%
Percentage Change in PECO Employment Growth Due to Change in Kwh Sales (Elasticity of .431)		-1.6%	-5.3%
Change in PECO Job Growth (Number of Jobs)		-132	-438

Exhibit GRS-2

PECO's Kwh Sales and Electricity Division Employment
(1976-1984)

Year	Kwh Sales (Billions)	Full-Time Equivalent Employment (Number of Employees)
1976	26.3	8149
1977	27.2	8159
1978	27.4	8170
1979	27.6	8078
1980	27.6	8132
1981	28.3	8264
1982	29.6	8595
1983	27.6	8948
1984	29.4	9169

Source: PECO's Uniform Statistical Report, Annual 1976-84, Submitted by PECO t
American Gas Association, Edison Electric Institute, and financial analysts. Thes
data are published by Edison Electric Institute or can be obtained directly fro
PECO.

Exhibit GRS-3

Linear Regression Relating PECO's Employment (EMP)
to PECO's Kwh Sales (Kwh)

$$EMP = 6974.22 + 125.809 \text{ Kwh} - 28.8247 \text{ TIME} + 260.438 \text{ DUM82} + 905.566 \text{ DUM83.84}$$
$$(5.9) \qquad (2.3) \qquad (1.1) \qquad (2.6) \qquad (9.0)$$

Period of Fit: 1976 - 1984
Method: Ordinary Least Squares

Adjusted R^2 = 0.975   S.E. = 63.9   D.W. = 1.87

(Terms in parenthesis under coefficients are t-statistics)

Mean of Dependent Variable (EMP) = 8407

Mean Value for Kwh = 27.9

Elasticity of EMP with Respect to Kwh:

At Mean: 0.417
For 1981 Values: 0.431

Definitions:

EMP = PECO full-time equivalent employment in its electricity division
(number of jobs)

Kwh = PECO Kwh sales (billions of Kwh)

TIME = Time trend (1976 = 76)

DUM82 = Shift variable reflecting beginning of Limerick Unit No. 1 related
employment increase (equals 1 in 1982; 0 elsewhere)

DUM83.84 = Shift variable reflecting Limerick Unit No. 1 related employment
increase (equals 1 in 1983 and 1984; 0 elsewhere)

SUPPLEMENTAL RESPONSES PURSUANT TO
52 PA. CODE §5.332 TO
IR-PECO-CITY-1-7(b)

Q.7. For each model and analysis identified in response to
Question 5, above, state:

Who developed the model or analysis and, if developed
by the expert or his or her organization or employer,
provide copies of all workpapers or other source
documents relied upon in developing that model or
analysis.

A.7. The Staff of the Wharton Policy Modeling Workshop has
assembled Supplemental Staff notes used in developing
the STARLOC Model used in connection with City Statement
No. 1. These Supplemental Staff notes are voluminous
and, therefore, are being made available for review
at the Wharton Policy Modeling Workshop,
University of Pennsylvania.

DOCKETED

MAR 18 1986

DOCUMENT
FOLDER
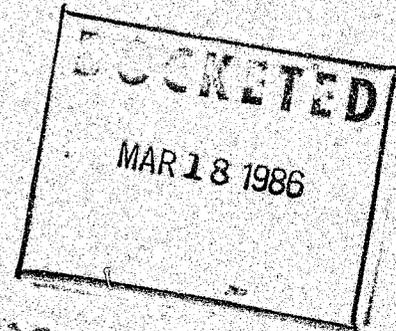
SUPPLEMENTAL RESPONSE PURSUANT TO 52 PA. CODE §5.332
TO ORAL DATA REQUEST OF CONSULTANTS OF
PHILADELPHIA ELECTRIC COMPANY
WHEN THEY MET WITH
DR. SCHINNAR
ON FEBRUARY 10-12, 1986

Q.   Provide the intermediate calculations of the STARLOC

Model used in City Statement No. 1.

A.   The cost to determine and print out the intermediate

calculations of the STARLOC Model computer runs used

in preparation of City Statement No. 1 (the "Project")

would be $21,025 (See Attachment IR-PECO-CITY-ODR-

2-10-86 - 2-12-86.) The Policy Modeling Workshop

of the Wharton School estimates it will take

approximately three (3) weeks from the date

the Project is begun to complete the Project. The

University of Pennsylvania requires a payment of

fifty percent (50%) in advance, with the remainder

due upon completion of the Project. Should the

Philadelphia Electric Company wish to pay for the

Project on the terms set forth above by the University

of Pennsylvania, the Policy Modeling Workshop of

the Wharton School will undertake the Project.

Cost Estimate for Reconstructing Intermediate Computer
Calculations of the STARLOC Model used in preparation of
City Statement No. 1.

PERSONNEL:

      15 man-days of principal investigator,
      research associate and computer programmer $ 13,500.00

COMPUTER TIME:

                                           7,525.00

                    Total Project Cost $ 21,025.00

ATTACHMENT IR-PECO-CITY-ODR-2-10-86 - 2-12-86

Exhibits WWH-30 through 3

are attached to 15A + 15B

Exhibits WWH – 1 thru 4
ATTACHED TO STATEMENT 37

Exhibits WWH – 5 thru 7
ATTACHED TO STATEMENT 37A

Ex. FC-1
ATTACHED TO STATEMENT NO. 3

Ex. FC-2
ATTACHED TO STATEMENT NO. 3

Ex. FC-3
ATTACHED TO STATEMENT NO. 36

PENNSYLVANIA PUBLIC UTILITY COMMISSION

VS

PHILADELPHIA ELECTRIC COMPANY

DOCKET NO. R-850152

EXHIBIT TO ACCOMPANY
ADDITIONAL REBUTTAL TESTIMONY
OF
JOHN J. CARROLL

SUPPORTING DATA FOR PECO'S ENERGY COST PROJECTION
RE: PRODCOST OUTPUTS

MARCH 1986

80/20 FILING - 7/86 - 6/89

ELECTRIC GENERATION AND FUEL COST ESTIMATES

MWH	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
OIL-PE STM.	168,000	155,000	153,000	116,000	157,000	197,000
COAL-PE STM.	274,000	314,000	202,000	198,000	182,000	217,000
COAL-MINEMTH	290,000	373,000	364,000	383,000	336,000	338,000
INT.COMB.	21,220	34,490	16,030	9,220	9,650	4,120
TOTAL FOSSIL	755,220	876,490	735,030	706,220	684,650	756,120
MWH NUCLEAR	1,749,658	1,719,997	1,348,452	1,294,362	1,244,081	1,307,604
NET HYDRO	23,000	(7,000)	1,000	50,000	76,000	163,000
OTHER	0	0	0	0	0	0
RECEIVED PJM	253,000	200,000	286,000	170,000	281,000	279,000
DELIV'D PJM	(122,000)	(190,000)	(104,000)	(89,000)	(120,000)	(134,000)
STEAM-HT PP	700	2,600	3,000	4,800	9,800	19,700
ME,PPL & DPL	16	16	16	16	16	16
2PARTY TRANS	205,000	200,000	196,000	211,000	210,000	228,000
INTCH & PUR	336,716	212,616	381,016	296,816	380,816	412,716
TOTAL OUTPUT	2,862,594	2,802,103	2,465,498	2,347,398	2,385,547	2,619,440

****

$	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
OIL-PE STM	8,742,000	8,111,000	8,085,000	6,457,000	8,079,000	9,956,000
COAL-PE STM	5,656,000	6,433,000	4,150,000	4,128,000	3,805,000	4,569,000
MINEMOUTH	4,179,000	5,257,000	5,253,000	5,459,000	4,803,000	4,894,000
INT.COMB	1,575,900	2,239,200	1,012,800	547,500	598,400	244,500
TOTAL FOSSIL	19,932,900	22,040,200	18,400,800	16,591,500	17,285,400	19,663,500
(NUCLEAR EXCLUDING INTEREST, BUT INCLUDING OIL)						
NUCLEAR	12,900,097	12,712,461	10,067,218	9,911,556	9,439,985	9,987,050
OTHER	0	0	0	0	0	0
RECEIVED PJM	7,556,000	6,926,000	9,091,000	6,412,000	8,339,000	9,221,000
DELIV'D PJM	(5,667,000)	(8,144,000)	(4,620,000)	(3,396,000)	(5,877,000)	(5,345,000)
STEAM-HT PP	24,000	90,000	105,000	170,000	345,000	756,000
ME,PPL & DPL	1,196	1,196	1,196	1,196	1,196	1,196
2PARTY TRANS	5,546,000	5,458,000	5,335,000	5,758,000	5,693,000	6,097,000
INTCH & PUR	7,460,196	4,331,196	9,912,196	8,945,196	8,501,196	10,730,196

INFORMATION FOR RATE DIVISION ($'S EXCLUDE FUEL HANDLING)

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
$-FIN.CHGS	40,295,193	39,083,857	38,380,214	35,448,252	35,226,581	40,380,746
FIN.CHGS	1,555,639	1,498,528	1,441,416	1,394,940	1,348,464	1,574,366
$&FIN.CHGS	41,843,832	40,582,385	39,821,630	36,843,192	36,575,045	41,955,112
(GAS $ INCLUDED IN COAL-PE STM)						
TOTAL GAS	545,000	625,000	354,000	315,000	107,000	0

INFORMATION FOR GEN. ACC. BUDGET GRP. (TOTAL FUEL HAND. $)

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
FUEL HANDL'G	851,072	936,240	834,285	838,548	844,109	844,445

M*H DISTRIBUTION 1 OF 4

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
OIL							
PE REHEAT OIL							
SCHUYLKILL#1	42,000	24,000	20,000	13,000	9,000	14,000	238,000
EDDYSTONE#3	75,000	20,000	16,000	17,000	41,000		452,000
EDDYSTONE#4	70,000	67,000	15,000	13,000	23,000	22,000	465,000
CROMBY#2	45,000	13,000	47,000	34,000	30,000	42,000	315,000
DELAWARE#7	30,000	17,000	11,000	9,000	3,000	12,000	203,000
DELAWARE#8	16,000	18,000	10,000	8,000	4,000	8,000	156,000
M*H R H OIL	278,000	159,000	119,000	102,000	86,000	139,000	1,829,000
PE MARGINAL OIL							
RICHMOND#9	0	0	0	0	0	0	0
SOUTHWARK#1	0	0	0	0	0	0	0
SOUTHWARK#2	0	0	0	0	0	0	0
M*H MARG OIL	0	0	0	0	0	0	0
REHEAT & MARGINAL OIL							
M*H OIL	278,000	159,000	119,000	102,000	86,000	139,000	1,829,000
PE COAL							
EDDYSTONE#1	122,000	110,000	105,000	115,000	105,000	99,000	1,346,000
EDDYSTONE#2	146,000	96,000	131,000	125,000	126,000	96,000	1,044,000
CROMBY#1	83,000	65,000	53,000	27,000	23,000	51,000	675,000
M*H COAL	351,000	271,000	289,000	267,000	254,000	246,000	3,065,000
PHILA. AREA OIL AND COAL							
PHILA STEAM	629,000	430,000	408,000	369,000	340,000	305,000	4,894,000
MEMO - STATION TOTALS							
EDDYSTONE	413,000	293,000	267,000	278,000	271,000	258,000	3,307,000
CROMBY	128,000	78,000	100,000	61,000	53,000	93,000	990,000
DELAWARE7&8	46,000	35,000	21,000	17,000	7,000	20,000	359,000
SOUTHWARK1&2	0	0	0	0	0	0	0

ELECTRIC GENERATION AND FUEL COST ESTIMATES

MWH

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
OIL-PE STM.	278,000	159,000	119,000	102,000	86,000	139,000	1,829,000
COAL-PE STM.	351,000	271,000	267,000	254,000	246,000	246,000	3,065,000
COAL-MXNEMTH	362,000	315,000	303,000	376,000	355,000	355,000	4,078,000
INT.COMB.	11,610	12,820	2,850	13,540	3,830	7,170	146,550
TOTAL FOSSIL	1,002,610	757,820	713,850	665,540	719,830	747,170	9,118,550
MWH NUCLEAR	1,615,336	1,194,971	1,282,790	802,797	915,192	864,980	15,340,222
NET HYDRO	99,000	130,000	213,000	224,000	163,000	77,000	1,192,000
OTHER	0	0	0	0	0	0	0
TOTAL OUTPUT	2,729,966	2,437,607	2,504,856	2,264,953	2,324,638	2,553,366	30,297,964
RECEIVED PJM	123,000	265,000	239,000	397,000	378,000	691,000	3,562,000
DELIV'D PJM	(355,000)	(124,000)	(162,000)	(19,000)	(28,000)	(17,000)	(1,434,000)
STEAM-HT PP	22,000	16,800	11,200	6,600	1,600	2,200	97,000
ME,PPL & DPL	16	16	16	16	16	16	192
2PARTY TRANS	223,000	199,000	207,000	190,000	175,000	178,000	2,422,000
INTCH & PUR	13,016	354,816	295,216	572,616	526,616	864,216	4,647,192

$

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
OIL-PE STM	13,686,000	8,202,000	6,106,000	5,497,000	4,772,000	7,305,000	94,998,000
COAL-PE STM	7,455,000	5,767,000	6,225,000	5,707,000	5,478,000	5,302,000	66,655,000
MINEMOUTH	5,324,000	4,575,000	4,274,000	4,248,000	5,586,000	5,210,000	58,962,000
INT.COMB	709,500	773,700	170,700	861,100	233,000	439,000	9,205,300
TOTAL FOSSIL	27,174,500	19,317,700	16,775,700	16,313,100	16,069,000	18,256,000	227,820,300

(NUCLEAR EXCLUDING INTEREST, BUT INCLUDING OIL)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
NUCLEAR.	12,143,597	9,135,427	9,850,891	5,984,421	6,786,589	6,350,323	115,267,615
OTHER	0	0	0	0	0	0	0
RECEIVED PJM	4,385,000	9,538,000	7,202,000	10,907,000	10,791,000	21,061,000	111,429,000
DELIV'D PJM	(17,372,000)	(6,410,000)	(6,795,000)	(1,010,000)	(913,000)	(364,000)	(165,913,000)
STEAM-HT PP	912,000	575,000	377,000	148,000	48,000	70,000	3,620,000
ME,PPL & DPL	1,280	1,280	1,280	1,280	1,280	1,280	16,856
2PARTY TRANS	5,956,000	5,335,000	5,652,000	5,269,000	5,012,000	5,031,000	66,142,000
INTCH & PUR	(6,117,720)	9,059,280	6,437,280	15,315,280	16,939,280	25,799,280	115,292,856

INFORMATION FOR RATE DIVISION ($'S EXCLUDE FUEL HANDLING)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
$-FIN.CHGS	33,200,377	37,492,407	33,063,871	37,612,801	37,792,869	50,405,603	458,380,771
FIN.CHGS	1,513,765	1,455,167	1,405,587	1,356,006	1,700,224	1,632,355	17,876,457
$&FIN.CHGS	34,714,142	38,945,574	34,469,458	38,970,807	39,493,093	52,037,958	476,257,228

(GAS $ INCLUDED IN COAL-PE STM)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
TOTAL GAS	0	40,000	587,000	568,000	478,000	3,619,000	5,148,699

=INFORMATION FOR GEN. ACC. BUDGET GRP. (TOTAL FUEL HAND. $)

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
FUEL HANDL'G	0	0	0	0	0	0	0

=INFORMATION FOR ... FUEL HANDL'G

MMH DISTRIBUTION 1 OF 4

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
OIL						
PE REHEAT OIL						
SCHUYLKILL#1	27,000	21,000	23,000	4,000	20,000	21,000
EDDYSTONE#3	53,000	37,000	44,000	42,000	39,000	43,000
EDDYSTONE#4	46,000	54,000	53,000	36,000	34,000	32,000
CROMBY#2	0	0	0	0		
DELAWARE#7	25,000	20,000	18,000	20,000	45,000	59,000
DELAWARE#8	19,000	23,000	15,000	14,000	18,000	22,000
					1,000	20,000
MMH R H OIL	168,000	155,000	153,000	116,000	157,000	197,000
PE MARGINAL OIL						
RICHMOND#9	0	0	0	0	0	0
SOUTHMARK#1	0	0	0	0	0	0
SOUTHMARK#2	0	0	0	0	0	0
MMH MARG OIL	0	0	0	0	0	0
REHEAT & MARGINAL OIL						
MMH OIL	168,000	155,000	153,000	116,000	157,000	197,000
PE COAL						
EDDYSTONE#1	106,000	117,000	114,000	128,000	120,000	105,000
EDDYSTONE#2	116,000	138,000	30,000	0	0	40,000
CROMBY#1	52,000	59,000	58,000	70,000	62,000	72,000
MMH COAL	274,000	314,000	202,000	198,000	182,000	217,000
PHILA, AREA OIL AND COAL.						
PHILA STEAM	442,000	469,000	355,000	314,000	339,000	414,000
MEMO - STATION TOTALS						
EDDYSTONE	321,000	346,000	241,000	206,000	193,000	220,000
CROMBY	52,000	59,000	58,000	70,000	107,000	131,000
DELAWARE7&8	42,000	43,000	33,000	34,000	19,000	42,000
SOUTHMARK1&2	0	0	0	0	0	0

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
MINEMOUTH (PE SHARE)						
KEYSTONE#1	107,000	108,000	95,000	109,000	94,000	90,000
KEYSTONE#2	13,000	84,000	88,000	96,000	85,000	90,000
KEYSTONE STA	120,000	192,000	183,000	205,000	179,000	180,000
CONEMAUGH#1	81,000	95,000	86,000	86,000	79,000	85,000
CONEMAUGH#2	89,000	86,000	95,000	92,000	78,000	73,000
CONEMAUGH STA	170,000	181,000	181,000	178,000	157,000	158,000
MINEMOUTH	290,000	373,000	364,000	383,000	336,000	338,000
PHILA. AREA OIL & COAL, AND MINEMOUTH COAL.						
FOSSIL STEAM	752,000	862,000	719,000	697,000	675,000	752,000
NUCLEAR (PE SHARE)						
PEACH BOT#2	259,117	281,339	252,759	216,140	290,270	208,102
PEACH BOT#3	229,541	272,658	206,693	188,222	132,811	266,502
PCH BOT STA	487,658	553,997	459,452	404,362	423,081	474,604
SALEM#1	282,000	266,000	242,000	247,000	275,000	247,000
SALEM#2	317,000	273,000	136,000	0	0	21,000
SALEM STA	599,000	537,000	378,000	247,000	275,000	268,000
LIM1	665,000	629,000	511,000	643,000	546,000	565,000
LIM2	0	0	0	0	0	0
LIM STA	665,000	629,000	511,000	643,000	546,000	565,000
MMH NUCLEAR	1,749,658	1,719,997	1,368,452	1,294,362	1,244,081	1,307,604
OTHER (PRECOMMERCIAL)						
LIMERICK 1	0	0	0	0	0	0
LIMERICK 2	0	0	0	0	0	0
OTHER	0	0	0	0	0	0

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
MINEMOUTH (PE SHARE)							
KEYSTONE#1	93,000	90,000	111,000	67,000	101,000		1,086,000
KEYSTONE#2	81,000	81,000	94,000	107,000	92,000		1,003,000
KEYSTONE STA	174,000	171,000	205,000	174,000	193,000		2,089,000
CONEMAUGH#1	96,000	82,000	92,000	87,000	86,000		1,056,000
CONEMAUGH#2	92,000	62,000	6,000	85,000	76,000		933,000
CONEMAUGHSTA	188,000	144,000	98,000	170,000	162,000		1,989,000
MINEMOUTH	362,000	315,000	303,000	283,000	355,000		4,078,000
PHILA. AREA OIL & COAL, AND MINEMOUTH COAL.							
FOSSIL STEAM	991,000	745,000	711,000	652,000	716,000	740,000	8,972,000
NUCLEAR (PE SHARE)							
PEACH BOT#2	276,873	14,290	0	0	248,293	275,980	2,322,163
PEACH BOT#3	259,465	228,681	237,790	246,797	156,899	0	2,426,059
PCH BOT STA	536,338	242,971	237,790	246,797	405,192	275,980	4,748,222
SALEM#1	263,000	257,000	283,000	281,000	300,000	287,000	3,228,000
SALEM#2	255,000	209,000	207,000	275,000	210,000	302,000	2,205,000
SALEM STA	518,000	466,000	490,000	556,000	510,000	589,000	5,433,000
LIM1	561,000	486,000	555,000	0	0	0	5,159,000
LIM2	0	0	0	0	0	0	0
LIM STA	561,000	486,000	555,000	0	0	0	5,159,000
MWH NUCLEAR	1,615,338	1,194,971	1,282,790	802,797	915,192	864,980	15,340,222
OTHER (PRECOMMERCIAL)							
LIMERICK 1	0	0	0	0	0	0	0
LIMERICK 2	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0

80/20 FILING - 7/86 - 6/89

MWH DISTRIBUTION 3 OF 4

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
DIESELS						
CROSBY D 1&2	20	0	0	0	100	40
DELAWARE D	30	20	0	20	40	0
SOUTHWARK D	0	0	0	0	0	0
SCHUYLKILL D	0	0	20	10	0	0
PE DIESELS	50	20	20	30	140	40
KEYSTONE D	10	20	10	0	0	0
CONEMAUGH D	10	10	10	0	0	0
DIESEL	70	50	40	30	140	40
GAS TURBINES						
RICH GE CT	5,250	7,730	2,710	1,290	2,710	280
RICH NE CT	0	0	0	0	0	0
RICH MO CT	0	0	0	0	0	0
RICHCT TOTAL	5,250	7,730	2,710	1,290	2,710	280
SOUTHWARK CT	210	740	400	0	0	0
EDDYSTONE CT	300	820	360	0	0	0
DELAWARE CT	270	750	370	0	0	0
SCHUYLKILLCT	100	450	100	0	0	0
CHESTER CT	210	480	300	0	0	0
FALLS CT	240	670	290	0	0	0
MOSER CT	240	780	330	0	0	0
PLY MTG CT	0	0	0	0	0	0
SUBTOTAL	6,820	12,420	4,860	1,290	2,710	280
CROYDON	16,300	22,000	11,100	7,900	6,800	3,800
GAS TURBINES	21,120	36,420	15,960	9,190	9,510	4,080
SALEM CT	30	20	30	0	0	0
TOTAL CT	21,150	36,440	15,990	9,190	9,510	4,080
TOTAL CT AND DIESEL	21,220	36,490	16,030	9,220	9,650	4,120
TOTAL IC						
SIMPLE CYCLE (INC. SALEM CT) CT TOTAL	6,850	12,440	6,890	1,290	2,710	280

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
DIESELS							
CROSBY D 1&2	0	70	10	0	0	0	240
DELAWARE D	170	40	0	50	0	0	370
SOUTHMARK D	0	0	0	0	0	0	0
SCHUYLKILL D	40	0	0	0	0	0	70
PE DIESELS	210	110	10	50	0	0	680
KEYSTONE D	0	0	0	10	0	0	50
CONEMAUGH D	0	0	0	10	0	0	40
DIESEL	210	110	10	70	0	0	770
GAS TURBINES							
RICH GE CT	1,300	1,010	140	3,420	830	1,470	28,140
RICH ME CT	0	0	0	0	0	0	0
RICH NO CT	0	0	0	0	0	0	0
RICHCT TOTAL	1,300	1,010	140	3,420	830	1,470	28,140
SOUTHWARK CT	0	0	0	120	0	0	1,470
EDDYSTONE CT	0	0	0	120	0	0	1,600
DELAWARE CT	0	0	0	250	0	0	1,640
SCHUYLKILLCT	0	0	0	30	0	0	680
CHESTER CT	0	0	0	180	0	0	1,170
FALLS CT	0	0	0	140	0	0	1,340
MOSER CT	0	0	0	210	0	0	1,560
PLY MTG CT	0	0	0	0	0	0	0
SUBTOTAL	1,300	1,010	140	4,470	830	1,470	37,600
CROYDON	10,100	11,700	2,700	9,000	3,000	5,700	108,100
GAS TURBINES	11,400	12,710	2,840	13,470	3,830	7,170	145,700
SALEM CT	0	0	0	0	0	0	80
TOTAL CT	11,400	12,710	2,840	13,470	3,830	7,170	145,780
TOTAL CT AND DIESEL TOTAL IC	11,610	12,820	2,850	13,560	3,830	7,170	146,550
SIMPLE CYCLE (INC. SALEM CT) CT TOTAL	1,300	1,010	140	4,470	830	1,470	37,680

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
OIL STEAM	168,000	155,000	153,000	116,000	157,000	197,000
PECOAL STEAM	274,000	314,000	202,000	198,000	182,000	217,000
HINEMOUTH	290,000	373,000	366,000	383,000	336,000	338,000
FOSSIL STEAM	732,000	842,000	719,000	697,000	675,000	752,000
MWH NUCLEAR	1,749,658	1,719,997	1,348,452	1,294,362	1,244,081	1,307,604
OTHER	0	0	0	0	0	0
DIESEL	70	50	40	30	140	40
TOTAL CT	21,150	34,440	15,990	9,190	9,510	4,080
NET INTCH	131,000	10,000	182,000	81,000	161,000	165,000
PUR POWER	716	2,616	3,016	4,816	9,816	19,716
2PARTY TRANS	205,000	200,000	196,000	211,000	210,000	228,000
CONOWINGO	79,000	57,000	52,000	85,000	125,000	181,000
MUDDY RUN	143,000	114,000	118,000	97,000	81,000	109,000
M R INPUT	(199,000)	(178,000)	(169,000)	(132,000)	(128,000)	(147,000)
TOTAL OUTPUT	2,862,594	2,802,103	2,465,498	2,347,398	2,385,547	2,619,440

NOTE: THIS PAGE EXCLUDES SALEM #2 WHILE SOLD TO J.C.

	JANUARY 1987	FEBRUARY 1987	MARCH 1987	APRIL 1987	MAY 1987	JUNE 1987	TOTAL
OIL STEAM	278,000	159,000	119,000	102,000	86,000	139,000	1,829,000
PECOAL STEAM	351,000	271,000	289,000	267,000	254,000	246,000	3,065,000
MINEMOUTH	362,000	315,000	303,000	283,000	376,000	355,000	4,078,000
FOSSIL STEAM	991,000	745,000	711,000	652,000	716,000	740,000	8,972,000
MHH NUCLEAR	1,615,338	1,194,971	1,282,790	802,797	915,192	864,980	15,340,222
OTHER	0	0	0	0	0	0	0
DIESEL	210	110	10	70	0	0	770
TOTAL CT	11,400	12,710	2,840	13,470	3,830	7,170	145,780
NET INTCH	(232,000)	141,000	77,000	378,000	350,000	694,000	2,128,000
PUR POWER	22,016	14,816	11,216	4,616	1,616	2,216	97,192
2PARTY TRANS	223,000	199,000	207,000	190,000	175,000	178,000	2,422,000
CONOWINGO	138,000	172,000	259,000	258,000	205,000	123,000	1,732,000
MUDDY RUN	90,000	95,000	97,000	82,000	81,000	116,000	1,223,000
M R INPUT	(129,000)	(137,000)	(116,000)	(123,000)	(162,000)		(1,763,000)
TOTAL OUTPUT	2,729,964	2,437,607	2,504,856	2,264,953	2,324,638	2,553,366	30,297,964

NOTE: THIS PAGE EXCLUDES SALEM #2 WHILE SOLD TO J.C.

	JULY 1986	AUGUST 1986	SEPTEMBER 1986	OCTOBER 1986	NOVEMBER 1986	DECEMBER 1986
OIL (NO.6 & NO.2)						
SCHUYLKILL#1	1,207,000	928,000	1,038,000	204,000	886,000	956,000
EDDYSTONE1&2	178,000	163,000	182,000	187,000	158,000	203,000
EDDYSTONE3&4	5,382,000	5,018,000	5,294,000	4,624,000	4,186,000	4,356,000
EDDY 1,2,3,4	5,560,000	5,181,000	5,476,000	4,611,000	4,344,000	4,559,000
ED (SULFUR)	0	0	0	0	209,000	396,000
EDDYSTONE	5,560,000	5,181,000	5,476,000	4,611,000	4,553,000	4,955,000
CROSBY#1	16,000	13,000	14,000	11,000	10,000	11,000
CROSBY#2	34,000	34,000	35,000	34,000	1,916,000	2,485,000
CR (SULFUR)	137,000	154,000	151,000	184,000	164,000	189,000
CROSBY	187,000	201,000	198,000	229,000	2,090,000	2,685,000
DELAWARE 7&8	1,925,000	1,955,000	1,524,000	1,597,000	923,000	1,945,000
RICHMOND	0	0	0	0	0	0
SOUTHWARK1&2	0	0	0	0	0	0
TOTAL OIL	8,879,000	8,265,000	8,236,000	6,641,000	8,452,000	10,541,000
COAL						
EDDYSTONE#1	1,914,000	2,100,000	2,072,000	2,365,000	2,201,000	1,943,000
EDDYSTONE#2	2,111,000	2,513,000	547,000	0	0	743,000
EDDYSTONE	4,025,000	4,613,000	2,619,000	2,365,000	2,201,000	2,686,000
CROSBY#1	929,000	1,041,000	1,026,000	1,264,000	1,124,000	1,298,000
TOTAL PECOAL	4,954,000	5,656,000	3,645,000	3,629,000	3,325,000	3,984,000
GAS FOR SCRUBBER						
EDDYSTONE#1	261,000	286,000	280,000	315,000	107,000	0
EDDYSTONE#2	284,000	339,000	74,000	0	0	0
TOTAL GAS	545,000	625,000	354,000	315,000	107,000	0
TOTAL OIL, TOTAL COAL & TOTAL GAS	16,378,000	14,544,000	12,235,000	10,585,000	11,884,000	14,525,000
PHILA STEAM	14,378,000					